United States Court of Appeals
for the
District of Columbia Circuit

TRANSCRIPT OF RECORD

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United States Court of Appeals for the District of Columbia

APRIL TERM, 1936.

No. 6822

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ROBERT E. CRAMER, APPELLANT,

vs.

CONWAY P. COE, COMMISSIONER OF PATENTS.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA.

FILED AUGUST 31, 1936

PRINTED OCTOBER 20, 1936

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PRESS OF BYRON S. ADAMS, WASHINGTON, D. C.

United States Court of Appeals for the District of Columbia

a. District Court of the United States for the District of Columbia.

No. 56888 in Equity

ROBERT E. CRAMER, *Plaintiff*,

vs.

CONWAY P. COE, Commissioner of Patents, *Defendant*.

UNITED STATES OF AMERICA,
District of Columbia, ss:

BE IT REMEMBERED, That in the District Court of the United States for the District of Columbia, at the City of Washington, in said District, at the times hereinafter mentioned, the following papers were filed and proceedings had, in the above-entitled cause, to wit:—

1 *Bill to Enforce Issue of Patent*

Filed March 13 1934

In the Supreme Court of the District of Columbia

In Equity No. 56888

ROBERT E. CRAMER, *Plaintiff*,

vs.

CONWAY P. COE, Commissioner of Patents, *Defendant*.

To the Honorable the Judges of the Supreme Court of the District of Columbia:

Robert E. Cramer, a citizen of the United States and resident of Pittsburgh, in the County of Allegheny and State of Pennsylvania, brings this, his against Conway P. Coe, who is the United States Commissioner of Patents, and is made a party hereto as said Commissioner, having official residence at the City of Washington, District of Columbia.

This suit is brought under and pursuant to Section 4915 of the Revised Statutes of the United States, which provides for a Bill in Equity in case of refusal by the Commissioner of Patents to grant Letters Patent on an application duly filed and prosecuted in the United States Patent Office; and thereupon—

Plaintiff for His Cause of Action Shows:

I.

That prior to about April 18, 1930, said Robert E. Cramer was the original, first and sole inventor of new and useful Improvements in the Method of Treating Rods and Wire, which invention was not known or used by others in this country before his said invention thereof, and not patented
or described in any printed publication in this or any
2 other country before his invention or discovery
thereof, or more than two years prior to the filing in the United States Patent Office of his hereinafter designated application for United States Letters Patent, and not in public use or on sale in the United States for more than two years prior to his said application for Letters Patent therefor, and which invention had not been patented by him or his legal representatives or assigns in any foreign country upon an application filed more than one year prior to the filing of his hereinafter recited application for United States Letters Patent, and which invention has not been abandoned.

II.

That on the 18th day of April, 1930, said Robert E. Cramer duly filed in the Patent Office of the United States an application, in writing, to the Commissioner of Patents, and filed in the Patent Office a written description of his invention and of the manner and process of making, constructing, compounding and using it, in such full, clear, concise and exact terms as to enable any person skilled in the

art or science to which it appertains or to which it is most nearly connected to make, construct, compound and use the same; and he explained the principle thereof and the best mode in which he had contemplated applying that principle so as to distinguish it from other inventions; and he particularly pointed out and distinctly claimed the part, improvement, or combination which he claims as his invention or discovery; the specification and claims of which application were signed by said Robert E. Cramer; and in accordance with the Statutes of the United States and the Rules of Practice of the United States Patent Office in such cases made and provided, the said application was given Serial No. 445,411, a certified copy of which application and
the actions and proceedings in the Patent Office
3 thereon plaintiff is ready in Court to produce as this
Honorable Court shall direct.

III.

That subsequent to the filing in the United States Patent Office of the said application, due proceedings were had thereon before the Primary Examiner of applications relating to the subject matter of said invention, such proceedings comprising actions by the said Primary Examiner in which certain prior United States patents and a certain foreign publication were cited in rejecting the claims from time to time in said application, and amendments and arguments presented on behalf of the said applicant in reply to the said actions by the said Primary Examiner; and as a result of such proceedings, on January 28, 1933, said Primary Examiner finally rejected the claims of said application, which were and are as follows:

1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to as least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

2. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and causing a forced circulation of air heated above 212 degrees Fahrenheit through the chamber.

3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212 degrees Fahrenheit and maintain it at approximately said temperatures.

4. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to at least 200 degrees Fahrenheit and maintaining said air at said temperature so as to bake said rods to remove occluded hydrogen absorbed
4 from the acid bath and also to dry the lime coating resulting from the lime bath.

5. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber, causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to a temperature above 212 degrees Fahrenheit and maintaining said temperature substantially constant so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

IV.

That on the 12th day of June, 1933, an appeal was duly taken to the Board of Appeals of the Patent Office from the final rejection by the said Primary Examiner of the claims; and thereafter, the said Board of Appeals, after due proceedings did on the 3rd day of November, 1933, render and file a decision affirming that of the Primary Examiner in finally rejecting the claims, and by the said decision of the said Board of Appeals, being the highest tribunal of the Patent Office having power and authority to determine finally the action of the Patent Office and of the Commissioner of Patents in respect to the granting of patents, a patent to plaintiff for the invention described in said claims was thereby refused.

V.

That the grounds of rejection urged by the Primary Examiner and by the Board of Appeals against the allowance to the said Applicant, Robert E. Cramer, of said rejected claims 1 to 5 inclusive were—

That the claims were unpatentable over certain prior United States patents, to wit—

Reynolds et al 205,764 July 9, 1878
Aiken 288,150 November 6, 1883
Cantoni 1,611,632 December 21, 1926 and the article by Hadfield in Royal Society of London (A), Vol. 123, Pages 184 and 185.

5 Profert of printed copies of the above mentioned patents and a photostatic copy of the article by Hadfield is hereby made.

VI.

That in view of said decision of the Board of Appeals of the Patent Office, the Defendant, Conway P. Coe, Commissioner of Patents, has refused and still refuses to grant to the Plaintiff, Robert E. Cramer, Letters Patent for the invention described in said claims, which claims Plaintiff has submitted and still submits are allowable and patentable to him.

VII.

That no Appeal has been taken from the decision of the said Board of Appeals to the Court of Customs and Patent Appeals and no such Appeal is pending or has been decided.

VIII.

That the entire right, title and interest in and to said invention and Letters Patent of the United States to be issued therefor, is vested in the Applicant, Robert E. Cramer, as he has made no assignment of his invention or his patent application; a certified copy of the title record to the invention and the application as it appears in the United States Patent Office Plaintiff is ready in Court to produce as this Honorable Court shall direct.

WHEREFORE, and forasmuch as the Plaintiff can have no adequate relief except in this Court, this Bill of Complaint is brought under and in accordance with the provisions of Section 4915 of the Revised Statutes of the United States in such case made and provided; and the Plaintiff prays that this Honorable Court, no notice to the Defendant, and other due proceedings had, may adjudge the said Robert E. Cramer to be the first, original and sole inventor of the invention set forth in the claims of the said application, and the Plaintiff to be entitled according to law to have Letters Patent granted to him for said inven-
6 tion, as set forth in said application and described in
the claims thereof; and that the said Defendant, Conway P. Coe, Commissioner of Patents, or his successor in office, be authorized and directed to issue Letters Patent to the Plaintiff, Robert E. Cramer, for said invention, as defined in said claims; and for such other and further relief in the premises as equity may require and to Your Honors may seem meet.

And may it please your Honors to grant and cause to be issued, in accordance with Section 4915 of the Revised Statutes of the United States, as amended by the Act of March 3, 1927, a writ of *subpoena ad respondendum* of the United States, issuing out of and under the seal of this Honorable Court, directed to the defendant, Conway P. Coe, as Commissioner of Patents, commanding him on a day certain to be named, and under a certain penalty, to be and appear in this Honorable Court, then and there to answer all and singular the premises and to stand by such further order, direction and decree as may be made in this behalf.

ROBERT E CRAMER

E. W. SHEPARD
Solicitor for Plaintiff

D. ANTHONY USINA
JOHN E. JACKSON—
Of Counsel

Oath

STATE OF PENNSYLVANIA,
County of Allegheny, ss:

Robert E. Cramer, being duly sworn, deposes and says that he is the plaintiff in this cause; that he has read the foregoing Bill of Complaint and knows the contents thereof; that the same is true of his own knowledge except as to such matters therein stated to be on information and belief, and as to those matters he believes it to be true.

ROBERT E CRAMER

7 Subscribed and sworn to before me, this 3rd day of March, 1934.

IRA GRIBBEN
(Seal) *Notary Public*

My Commission expires January 19, 1935

Answer to the Bill of Complaint.

Filed March 31 1934

* * * * * * * * *

To the Honorable
The Judges of the Supreme Court
of the District of Columbia.

Conway P. Coe, Commissioner of Patents, defendant, is absent from the District of Columbia and in his absence Richard Spencer, Acting Commissioner, in answer to the Bill of Complaint alleges on information and belief as follows:

He admits the allegations of citizenship and residence of the parties hereto and the allegation of jurisdiction under Section 4915 R. S.; 35 U. S. C. A. 63.

I. He has no information as to plaintiff's allegations of invention and the non-existence of statutory bars except as informed by the Bill and by plaintiff's application for letters patent hereinafter referred to.

II. He admits that plaintiff Robert E. Cramer, on the 18th day of April, 1930, filed an application for letters patent in the United States Patent Office, to which Serial No. 445,411 was given.

III. He admits that after due proceedings before the examiner in the Patent Office the examiner finally rejected the claims recited in paragraph III. Defendant denies that these claims are patentable to plaintiff as they are unpatentable over the following prior art:

8 Reynolds, 205,764, July 9, 1878,
Aiken, 288,150, Nov. 6, 1883,
Cantoni, 1,611,632, Dec. 21, 1926.
Article by Hadfield in "Royal Society of London", (A), Vol. 123, pages 184 and 185.

Profert of copies of this art is hereby made.

IV. He admits that appeal was taken from the decision of the examiner to the Board of Appeals, which Board of Appeals on the 3rd day of November, 1933, rendered a decision affirming the decision of the examiner and thereby a patent to plaintiff for the invention described in said claims was refused.

V. He admits that the prior art cited in paragraph V comprised grounds of rejection by the examiner and was relied upon by the Board of Appeals.

VI. He admits that the Commissioner of Patents has refused and still refuses to grant to plaintiff letters patent for the invention described in said claims. Defendant denies that the claims are allowable to plaintiff, as more fully appears from the statement of the examiner and the decision of the Board of Appeals, copies of which will be presented at the trial.

VII. He admits that no appeal to the United States Court of Customs and Patent Appeals has been taken in this case.

VIII. He admits the allegations of assignment.

FURTHER ANSWERING defendant denies each and every allegation of the Bill of Complaint not herein specifically and sufficiently denied or admitted, and prays that plaintiff's Bill of Complaint be dismissed.

WHEREFORE defendant having fully answered the Bill of Complaint denies that plaintiff is entitled to the relief demanded or any part thereof and prays that the Bill be dismissed with all costs of the proceedings against the plaintiff as provided in Section 4915 R. S. 9

RICHARD SPENCER
Acting Commissioner.

T. A. HOSTETLER,
Solicitor of the U. S. Patent Office,
Attorney for Defendant.

District of Columbia,
City of Washington, ss:

I, Richard Spencer, depose and say that Conway P. Coe, Commissioner of Patents, is absent from the District of Columbia and in his absence I am Acting Commissioner; that I have read the above answer by me subscribed and know the contents thereof; that the statements of facts therein made as upon personal knowledge are true; and that those made upon information and belief I believe to be true.

RICHARD SPENCER.
Acting Commissioner.

Subscribed and sworn to before me this 30th day of March, 1934.

ALBERT W. KAISER
(Seal) *Notary Public, D. C.*

My commission expires March 21, 1938.

Memorandum

JANUARY 15—1935.

Deposit by E. W. Shepard, for plaintiff, as security for costs $50.00.

Memorandum Opinion

Filed February 24 1935

* * * * * * * * *

I agree with the conclusions reached by the tribunals of the Patent Office. The bill will be dismissed with Costs.

BAILEY,
J.

Findings of Fact

Filed April 28 1936

* * * * * * * * *

1. The application of Robert E. Cramer, Serial No. 445,411, involved in the present suit, discloses a "Method of Treating Rods and Wire" to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wires in a chamber, causing a forced re-circulation of air in said chamber and passing said air over a heater during its re-circulation to heat said air to temperatures above 212 degrees F. and maintain the air at approximately said temperatures.

2. The method of said Cramer application due to the forced circulation and re-circulating of the heated air removes the brittleness caused by occluded hydrogen in less than one-half the time required by the prior art as exemplified by the Hadfield publication, Reynolds patent No. 205,764 and the practice in general use in the wire industry; also, the method of the above Cramer application permits the removal of the brittleness caused by occluded hydrogen at a fuel cost of about one-third the fuel cost of any prior art method or methods and permits other material savings in labor cost.

3. The article by Hadfield discloses that occluded hydrogen can be removed from metal articles by treating such articles at a temperature of 100 degrees C.

4. Hadfield does not disclose the use of circulating heated air in a closed chamber.

5. The patent to Reynolds et al., No. 205,764, discloses a process of removing occluded hydrogen from an iron
article by exposing the article for six or seven hours
11 to air heated to 200 degrees F. or 300 degrees F.

6. Reynolds does not disclose the circulating of heated air in a closed chamber.

7. The patent to Aiken, No. 288,150, discloses the step of liming iron rods after the pickling operation and relates primarily to a wire or metal cleaning bath. The Aiken patent discloses that pickled rods are subject to hydrogen occlusion, and that this hydrogen occlusion can be prevented or diminished by adding to the pickling bath some

of the soluble salts of cyanide, which salts serve as an inhibitor. This Aiken patent was cited by the Patent Office merely to show that the liming step was old prior to the filing of the Cramer application.

8. Inhibitors such as disclosed by the Aiken patent do not prevent occlusion of hydrogen, and even where such inhibitors are used rods must still be baked to remove brittleness caused by occluded hydrogen.

9. It has been the practice long prior to the work of Cramer to bake rods which had been through a pickling operation in a closed chamber heated entirely by radiation in such manner that the chamber had varying temperatures at various points therein and the air in said chamber was not circulating.

10. The Cantoni patent, No. 1,611,632, discloses an apparatus for drying fruit comprising a chamber having heating flues therein and having a fan in a compartment connected to the chamber. The apparatus of this patent is operated so as to provide hot and cold zones through which the product to be dried is moved. In operation, cars laden with trays of fruit are placed in the chamber and air circulated by the fan is drawn under and over the heating flues and through the trays on the cars. The chamber
12 is provided with doors 13 and 14 which are opened sufficiently to cause a discharge of the air from the chamber for the purpose of removing moisture.

11. The process of Cramer has been extensively used by his licensee, The American Steel and Wire Company of New Jersey.

Conclusions of Law

1. It was not invention to circulate the air in the heated chamber of the prior practices of baking rods to remove occluded hydrogen.

2. Claims 1 to 5, inclusive, of the Cramer application, Serial No. 445,411, are not patentable.

3. The Bill should be dismissed.

JENNINGS BAILEY.
Justice.

Final Decree.

Filed April 28 1936

* * * * * * * * *

This cause having come on to be heard and having been tried in open court and argued by counsel for the respective parties upon the pleadings and proofs adduced and submitted to the Court,

It is ADJUDGED, ORDERED and DECREED this 28th day of April, 1936, that the Bill of Complaint in this case be, and the same hereby is dismissed with costs against the plaintiff.

JENNINGS BAILEY—
Justice.

Approved as to form:

E. W. SHEPARD
Attorney for Plaintiff.

13 From the foregoing decree the plaintiff, Robert E. Cramer, in open court on the date named above, notes an appeal to the United States Court of Appeals for the District of Columbia, and the Court fixes the cost bond on said appeal in the sum of $100, or in lieu thereof the sum of $50 in cash to be deposited with the Clerk of this Court.

JENNINGS BAILEY.
Justice.

Memorandum

MAY 19—1936.

$50. deposited in lieu of Bond on Appeal.

Assignment of Error

Filed June 3—1936

* * * * * * * * *

Now comes the Plaintiff in the above entitled cause, by its Solicitor, and having taken an Appeal to The United States Court of Appeals for the District of Columbia from the Decree made and entered in this cause on the 28th day of April, 1936, says that said Decree, and Conclusions of Law are erroneous, unjust and against the rights of said Plaintiff, and as assignment of error therein represents that said The Supreme Court of the District of Columbia erred in the following particulars:

1. The Court erred in paragraph 1 of the Conclusions of Law in holding that it was not invention to circulate the air in the heated chamber of the prior practices of baking rods to remove occluded hydrogen.

2. The Court erred in paragraph 2 of the Conclusions of Law in holding that claims 1 to 5, inclusive, of the Cramer application, Ser. No. 445,411, are not patenable.

3. The Court erred in dismissing Plaintiff's Bill of Complaint.

4. The Court erred in not granting the prayers of
14 Plaintiff's Bill of Complaint.

Wherefore, Plaintiff prays that said Decree be reversed, and that this case be remanded with instructions that the prayers in Plaintiff's Bill of Complaint be granted.

E. W. SHEPARD
Solicitor for Plaintiff

Service of the above Assignment of Error and receipt of a copy thereof hereby acknowledged this 2nd day of June, 1936.

R. F. WHITEHEAD
Solicitor for Defendant.

Supreme Court of the District of Columbia

Monday, June 22, 1936

The Court resumes its sessions pursuant to adjournments, the Justices sitting in Equity, presiding.

* * * * * * * * *

Come now the parties hereto by their respective attorneys of record, and thereupon, the plaintiff by his attorney presents to the Court his Statement of Evidence taken at the trial of this cause, and prays that the same be signed and made of record, *nunc pro tunc,* which is hereby accordingly done.

JENNINGS BAILEY,
Justice.

Designation of Record

Filed June 3—1936

* * * * * * * * *

Now comes the Plaintiff, Robert E. Cramer, the Appellant in the above entitled cause, and designates the parts of the record which it desires to have included in the Transcript, said parts being considered sufficient for the determination of the questions raised on Appeal, namely:

15 1. Bill of Complaint.
2. Defendant's Answer.
3. Memorandum of Deposit for Costs.
4. Memorandum Opinion of Mr. Justice Bailey.
5. Findings of Fact and Conclusions of Law.
6. Final Decree, notation of appeal in open court and order fixing bond for Costs of Appeal and cash deposit in lieu thereof.
7. Memorandum of Deposit for Costs on Appeal.
8. Assignment of Error.
9. Statement of Evidence (including)
    I. Plaintiff's Exhibits Nos. 1 and 2; and
    II. Defendant's Exhibit No. 1 (comprising)
        A. U. S. patent 205,764 to Reynolds
        B. U. S. patent 288,150 to Aiken
        C. U. S. patent 1,611,632 to Cantoni
        D. Article by Hadfield in "Royal Society of London", (A), Vol. 123, pages 184 and 185.
        E. Prints of Plaintiff's Patent Application Drawings
        F. Examiner's Statement
        G. Decision of Board of Appeals.
10. This Designation of Record.

E. W. SHEPARD
Solicitor for Robert E. Cramer,
Plaintiff-Appellant

Stipulation

It is this 2nd day of June, 1936, hereby stipulated and agreed by and between the parties hereto, by their respective Attorneys, that the Transcript on Appeal shall constitute those parts of the original proceedings as are set forth in the foregoing Designation of the Record, to which this Stipulation is attached; service and receipt of a copy of such Designation of the Record are hereby acknowledged by the Defendant.

E W SHEPARD
Solicitor for Plaintiff-Appellant.

R. F. WHITEHEAD
Attorney for Defendant.

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16 District Court of the United States for the District of Columbia.

UNITED STATES OF AMERICA,
District of Columbia, ss:

I, Charles E. Stewart, Clerk of the District Court of the United States for the District of Columbia, hereby certify the foregoing pages numbered from 1 to 15, both inclusive, to be a true and correct transcript of the record, according to directions of counsel, herein filed, copy of which is made part of this transcript, in cause No. 56888 in Equity, wherein Robert E. Cramer is Plaintiff and Conway P. Coe, Commissioner of Patents, is Defendant, as the same remains upon the files and of record in said Court.

IN TESTIMONY WHEREOF, I hereunto subscribe my name and affix the seal of said Court, at the City of Washington, in said District, this 26th day of August, 1936.

CHARLES E. STEWART,
Clerk.

By CHAS B COFLIN,
Assistant Clerk.

(Seal)

17 Endorsed: United States Court of Appeals for the District of Columbia Filed Aug 31 1936 Moncure Burke Clerk

In the Supreme Court of the District of Columbia

Equity No. 56,888

ROBERT E. CRAMER, *Plaintiff,*

v.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Condensed Statement of Evidence

Be it remembered that the above entitled cause came on for trial upon the issues framed by the pleadings, on Tuesday, February 18, 1936, Mr. Justice Jennings Bailey presiding, and thereupon the following proceedings were had, evidence offered and given, and rulings made by the Court:

The following exhibits were marked and received in evidence on behalf of the Plaintiff:

Plaintiff's Exhibit 1, certified file and wrapper of Plaintiff's patent application, Serial No. 445,411.

Plaintiff's Exhibit 2, blueprint D-446, American Steel & Wire Company, Allentown Works' drawing, showing Plaintiff's (Cramer) construction of baker.

(The following exhibits were marked and received in evidence on behalf of the Defendant:

Defendant's Exhibit 1, folder containing patents, drawings, Examiner's Statement, and decision of Board of Appeals of the Patent Office.)

Thereupon, to maintain the issue, Plaintiff offered
18 in evidence—

Robert E. Cramer as a witness for himself, who, having been sworn, stated in substance:

Direct examination.

By Mr. Jackson:

My name is Robert E. Cramer. I am forty two years of age and reside in the Borough of Brentwood, Pennsylvania. I am employed by the American Steel & Wire Company, which company manufactures steel and steel wire products. I have been employed by the American Steel & Wire Company since 1910, and at present I am District Engineer of the Pittsburgh District. In 1929 I was also District Engineer.

I made an application for United States patent for a method of treating rods and wire. (The witness was shown a certified copy of the file, wrapper and application, Plaintiff's Exhibit 1.) This file wrapper is of my application.

(The witness was here shown two sheets of drawings and asked to compare them with the drawings in the certified copy of file wrapper, and it was agreed upon question of the Court by Mr. Whitehead, attorney for Defendant, that there was no question about the drawings, and the drawings were thereafter used and were not entered as an exhibit.)

Prior to my invention wires and rods were baked in ovens known as "rod bakers". These were generally brick and steel ovens, with a rectangular cross-section, and totally enclosed a space in which there were a number of tracks on which the rods were loaded in wire baskets ready for baking. The ovens were composed of fire brick, and 19 were heated by direct firing of convenient fuel, such as coal, oil, or gas, the furnace being located below the general floor level, and the products of general combustion passing through flues under the baker floor, thence upward and back over the top of the ovens, through flues suspended from the baker ceiling, and thence to the stack. The products of combustion purposely did not come in contact with the material being baked, and the heating effect was entirely by radiation from the flues. The baker atmosphere was entirely stagnant—that is, non-moving. The temperatures within the ovens were variable, not readily known, and not readily obtained, so that time of baking was more or less haphazard.

After establishing the above facts, I took steps to improve the method of baking rods, for removing the occluded hydrogen by first determining on a simple means of transferring and moving large volumes of heat. Then I presented my ideas on improvement to the management (of the American Steel & Wire Company), in writing, and obtained permission to make a test under conditions which would simulate mill practice. This test was made at the Allentown Works of the American Steel & Wire Company.

The test which I made consisted of, first, the construction of a single-track experimental baker, provided with a means of heating and circulating a large volume of air. On the track of the baker we placed a normal tonnage of rods on trucks, and circulated the heated air constantly over the material to be baked. We found immediately that the temperatures in all parts of the oven were essentially uniform, and that the time of baking was materially shortened. We found that the time of baking in this experimental oven was approximately one third to one half less than the time which was necessary to bake rods in the ovens previously used.

After using the experimental oven and operating
20 it in accordance with my method we built a full-sized
oven or baker at the Allentown Works of the American Steel & Wire Company, and this oven operated as I expected, and gave substantially the same results as the experimental oven which I have previously described.

I do not know of any rod baker in the prior art, in the American Steel & Wire Company or any other company, prior to my invention, in which rods were baked by circulating air. I have been referred to the Reynolds and Haskell patent No. 205,764, dated July 9, 1878, which is a reference relied on in this case. This Reynolds and Haskell patent relates to a method of removing occluded hydrogen from rods or wires which have been pickled, the patent covering simply a method which consists of boiling the metal in hot water. This is certainly not similar to my method of baking rods. The patent speaks of two processes, prior to the date of the patent which were in common use, which were the hot air process (which I assume to be the common, direct fired baker) and the cold water process. Objections are given to both of these processes, one being considerable time, and in the case of the hot air method, the objection of frequent re-cleaning is given. This (re-cleaning) is found in the old-type bakers, because the flues would leak, and soot and other forms of material would be deposited on the rods.

I see nothing in this patent that relates to my method. I do not find any disclosure in the Reynolds and Haskell patent No. 205,764 suggesting a method of treating rods and wire to remove occluded hydrogen, which consists in enclosing the rods or wire in a chamber and circulating air heated to at least 200° F., and maintaining the air at substantially constant temperature throughout the chamber.

I now refer to the Aiken patent No. 288,150, dated
21 November 6, 1883, relied on as a reference in this
case. This patent covers a wire or metal cleaning bath. It discloses that pickled rods are subject to hydrogen occlusions; this is a well known fact in the industry. The patent specifically covers a method of adding to the pickling bath some of the soluble salts of cyanide, to prevent this occlusion of hydrogen. This is, in effect, an inhibitor; and it is well known that inhibitors do not prevent occlusion of hydrogen. And even where they are used, the rods must still be baked. There is no disclosure in this Aiken patent of a method of baking rods or wire in any manner whatsoever, the patent simply relating to a cleaning bath.

I now refer to the Cantoni patent No. 1,611,632, dated December 21, 1926. This patent covers a specific form of oven for drying fruits and vegetables, and comprises essentially hot and cold zones. Such a method could not be used for baking rods, as my method specifically requires temperatures of at least 200°, and uniform temperatures.

The ideas of this patent are clearly stated in the following, which I will quote:

"It will be understood by those skilled in the art that in the earliest stages of the drying, the temperature must not be too high, but that during intermediate stages of the drying, the temperature can be considerably higher without injuring the fruits or vegetables, but that during the latter stages of the drying, the temperature must be again somewhat lower, so that in the present instance the drying chambers are so arranged as to have the fruit move from the cooler end of the dryer to the hotter end, and then to have the cars containing the trays turned around and moved in another channel, away from the hottest part of the dryer
to the cooler portion thereof, until the end of the
22 treatment."

Such a method could not be used for baking rods. This patent further provides for a continuous supply of fresh air to come into the dryer and the inventor states that doors 13 and 14 are allowed to be opened sufficiently to cause a discharge.

In rod baking the doors are constantly kept closed while the baking is in process. I therefore see nothing in this patent that relates to my baking of rods.

I now refer to an article by Hadfield, of the Royal Society of London (A), Volume 123, pages 184 and 185, which is also a reference relied on in this case. This Hadfield article merely discloses that steel which has been exposed to nascent hydrogen will recover its original properties when heated to approximately 100° C. or 212° F. This fact has always been well known in the wire industry, and other than this well known fact, I see nothing that has any bearing on my invention.

After considering the disclosures of the Reynolds and Haskell, Aiken, and Cantoni patents, and the Hadfield article, and in view of my experience in the wire manufacturing art, I do not find anything which, in my opinion, discloses or teaches that more efficient baking of rods may be had by a method which includes enclosing the rods or wire in a chamber, circulating the air heated to at least 200° F., and maintaining substantially constant temperature throughout the chamber.

23 **Flint C. Elder**, a witness for Plaintiff, having been sworn, stated in substance:

Direct examination.

By Mr. Jackson:

During the prosecution of this application, there has been some question of whether there is really occluded hydrogen in the rods. Now, Mr. Flint C. Elder, who is the chief chemist and metallurgist of the American Steel & Wire Company, has made positive tests which show positive occluded hydrogen. If Mr. Whitehead will stipulate that there is positive occluded hydrogen in these rods, I shall not question Mr. Elder.

Mr. Whitehead. I am perfectly willing to do that.

Mr. Jackson. All right, Mr. Elder; you are dismissed.

24 **James F. Phifer**, a witness for Plaintiff, having been sworn, stated in substance:

Direct examination.

By Mr. Jackson:

My name is James F. Phifer. I am sixty six years of age and reside in Allentown, Pennsylvania. I am employed by the American Steel & Wire Company, having been in their employ over forty years. I have held the position of Master Mechanic, Assistant Superintendent; and, for the last twenty five years, as Superintendent of the Allentown plant of this company.

I am familiar with the processing of rods and wire preparatory to drawing the same. Rods and wire are rolled hot, which, of course, results in black scale that must be removed, and a very convenient way is to put the wire or rods in a solution of sulphuric acid and water, which removes the scale but which, incidentally, puts some hydrogen gas into the steel; that is, the steel absorbs the hydrogen gas, which must be removed. After the scale has been removed the wire or rods are rinsed in clean water to remove the acid solution from their surfaces, and they are then allowed to sull, which is rusting. After sulling they go into a solution of lime water, to counteract any further action of acid which might still be remaining on the product, and also to prevent further sulling or rusting.

We must bake the wire or rods to drive out the occluded hydrogen gas, and that is the process which is under discussion. Before 1929 our baker was just about the size of this room (indicating the court room), and at one end there were furnaces or fires, covered with fire brick roofs, and brick tunnels running along the floor, and then steel conduits or uptakes at the end, and return flues. The oven was a large open room, with about an eight foot ceiling.

The objection to the construction of oven was that, first, there was not a very great radiation of heat through the fire brick flue, and fire brick flues were necessary in order to prevent burning out and destruction of the flues. We got the heat in the oven generally from the overhead flues, which is where we did not want it, since the heat was up against the ceiling and we wanted it down where the rods were. But there was no way of getting the heat down, especially since you had to open the doors occasionally, and what cold air came in naturally went to the bottom.

I have never given this subject a thought because, as I have said, the objectionable practice was general. He (Cramer) came along with his idea, and we made the experiment at Allentown, by constructing a single compartment baker and blowing hot air through it and re-circulating it. We are now getting a uniform temperature throughout this (Cramer style) baker which results not only in baking out the occluded hydrogen gas, but doing it very much quicker and very much cheaper. It is the circulation of hot air—re-circulated—which maintains the temperature throughout the whole compartment under a uniform temperature, and this was not possible under the old or former construction.

In 1929 we constructed a full-sized baker operable in accordance with the Cramer method, and this baker is still in operation, and it still gives the results I have described above. If we maintain a temperature of around 215°, which is not unusual, we can bake a rod—say, a common steel rod—in three to four hours where formerly (that is, before the Cramer method) it required from six to eight hours, due to the poor application of the heat.

26 I refer to a drawing, one of which is a copy from the Cramer application, which discloses the principle of operation of the circulating air ovens we have at Allentown. The baker of this drawing is a little smaller than the one we have at Allentown; ours has a delivery of air in the center, and goes to each end and returns; however, the principle is the same.

Referring to Plaintiff's Exhibit 2, this is a view of our construction; it is an end elevation of the Allentown baker.

From my experience since the Cramer method has been in practice, it is my opinion that the method of the Cramer application, which is the method I have described, and which is broadly expressed in the application as the method of treating rods and wire to remove brittleness caused by occluded hydrogen, which consists in enclosing the rods or wire in a chamber and re-circulating air heated to at least 200° F., and maintaining it at substantially constant temperature throughout the chamber, is a decided improvement over the method of baking rods in which the air is not circulated, which method was used prior to the Cramer invention. In fact, I think the Cramer method is a very decided improvement.

27 **Albert W. Trenbath**, a witness for Plaintiff, having been sworn, stated in substance:

Direct examination.

By Mr. Jackson:

I am forty four years old and am employed by the American Steel & Wire Company at their Donora Works, Donora, Pennsylvania, in the capacity of Wire Mill Foreman. I have under my jurisdiction the operation of the cleaning house of the Donora Works. This cleaning house includes the operation of pickling rods to remove scale. I am familiar with the baking of rods after they have been cleaned and coated with lime. The rods are baked for the primary purpose to remove occluded hydrogen and, secondarily, to dry the lime coating which has been applied to the rods in order to neutralize any acid that may be left on the surface of the rods. We have at our Donora Works the old type of bakers which are rectangular in shape and approximately 60 feet long and 38 feet wide. They are heated by fires on the extreme end of the baker, and the end of this baker opposite the fires is colder than the fired end, and the center of the baker is also colder than the part directly over the fire box. The bakers are single-track type, with steel doors on the front and back, for charging or discharging the wire baskets. The bakers are constructed of brick and steel.

To my own knowledge, wire bakers of the above general type are in use generally in the industry. That is, with the exception of the Cramer method of baking, the old-style bakers are in general use today. The old-style bakers are not evenly heated. We get a temperature of about 200 or 250° F., and the one end of the baker as a great deal hotter than the other, that is, the end that is directly over the fire box is the hottest. When we are rushed for production
28 it is common practice to remove the baskets of rods from the ends farthest away from the fire boxes, and put them into hotter zones, where we are sure they will get more heat. At the Donora Works we have a special wire, and a lot of the wires are high in carbon, and some alloy steel. It is, therefore, necessary to bake these rods approximately ten or twelve hours, although in the common form of steel, rods are baked only five or six hours.

The rods are baked primarily to remove occluded hydrogen. If it is not the desire to remove the occluded hydrogen but only to dry the lime on the rods and neutralize the acid remaining, it would not be necessary to bake the rods, since the lime coating could be dried in room temperatures. The baking is not a drying operation by any means.

I have many times found rods which were brittle after baking, and this is known as "acid brittleness". Acid brittleness is due to occluded hydrogen. When I found acid brittle rods we re-baked the rods in the hotter zones of the baker, and the re-baked rods were free of brittleness. This is common practice, especially with high-carbon alloy wires.

I am not a chemist and I do not know that it is occluded hydrogen that makes the rods brittle. However, this is a common theory and an accepted fact in the wire industry.

W. E. Acomb, a witness for Plaintiff, having been
29 sworn, stated in substance:

Direct examination.

By Mr. Jackson:

I am fifty six years old; reside at Lake Bluff, Illinois; and I am superintendent of the Waukegan Works of the American Steel & Wire Company, Waukegan, Illinois.

I have been employed by the American Steel & Wire Company thirty one years, and my duties include supervision of rod bakers. I have heard descriptions by the previous witnesses of rod bakers that were used prior to 1929, and I am familiar with this type of rod baker, and I agree with the descriptions that have been given.

I am familiar with the new type of rod baker and method developed by Mr. Cramer that has been testified about here.

We have rod bakers of both the old and new types at out plant.

The Cramer style baker costs from 75 to 80 per cent of the cost of the old-style baker for an initial construction, and the Cramer style baker and method of baking rods occupies about half the floor space for the same capacity as the old-style bakers, and the Cramer method will bake the rods in about half the time of the old-style baker.

An ordinary five gauge rod with heavy lime coating requires at least four hours baking in the old-style baker, and we bake the same rod with the same coating in two hours in the Cramer baker. With this same rod, with a lighter lime coating, that requires from two to three hours to bake in the old-style baker, we bake such rods in an hour or an hour and a half in the Cramer baker.

We attribute the saving of time in baking by the
30 Cramer method, over that practiced in the old-style
bakers, with their stagnant air, to the rapid circulation of the heated air and a uniform temperature of the baker throughout, due to the circulating air.

Another advantage is that when the old coal fired bakers were started after a week-end shut down, it required from eight to sixteen hours to get the baker up to operating capacity, while with the Cramer baker with its circulating air, the baker is brought up to operating capacity in a hour or an hour and a half.

From my own experience, the cost of baking rods by the Cramer method is greatly favorable over the cost of baking by the old-style method. We find that the fuel cost for the Cramer baker is about one-third of the fuel cost of the old coal-fired baker. We eliminate entirely the labor of firing the coal and hauling the ashes, and our repair expense is very much less.

The quality of the product baked by the Cramer method is much better than the quality baked by the old-style method. The rods throughout the baker are heated uniformly by the Cramer method, and we do not have any difficulty with some rods in some parts of the oven or baker being brittle. Furthermore, we have no foreign substances on the rods from leaky flues, such as smoke or soot, depositing on the rods. With the old-style bakers it was common to have smut and other foreign matter deposited on the rods, especially when the baker needed repairing and the flues leaked, and this smut or smoke was detrimental to the wire drawing.

I now refer to the Reynolds et al. patent No. 205,764, dated July 9, 1878. This patent provides for removing the acid brittleness from the rods by boiling in water. It mentions this as an improvement over the method of removing the brittleness by what they call the "hot air process", which we assume, on account of the date of the patent, is
simply heating in stagnant air, according to the old-
31 style baker. As an experienced wire mill man, I see
no disclosure in this patent that would teach the method of baking which is used by Cramer.

I now refer to the Aiken patent No. 288,150, dated November 6, 1883. I find no disclosure in this Aiken patent which teaches me, as an experienced wire mill man, the Cramer method. This Aiken patent simply covers the introduction of some chemical into the acid, and to prevent the acid brittleness resulting from hydrogen occlusion, and it makes no reference whatever to a baking of the rods.

I now refer to the Cantoni patent No. 1,611,632, dated December 21, 1926. I find no disclosure in this Cantoni patent of baking rods. This patent relates to the drying of fruits and vegetables.

I now refer to the article by Hadfield, in the Royal Society of London, Volume 123, pages 184 and 185. This article does not refer in any way to the baking of rods by circulating air.

Plaintiff rests.

Defendant presented no witnesses, but offered in evidence a certain exhibit which was received in evidence and marked Defendant's Exhibit 1.

Defendant rests.

The taking of evidence was concluded and argument had.

No briefs were filed by Plaintiff or Defendant.

32 Be it further remembered that the foregoing, together with the exhibits appended hereto, contains the substance of all the evidence given at the hearing of this cause, and is approved, signed and ordered to be made of record in the above entitled cause this the 22nd day of June, 1936.

JENNINGS BAILEY
Justice.

It is stipulated and agreed that the Statement of Evidence as prepared and filed by the Plaintiff, service and receipt of a copy of which are acknowledged by the defendant, shall constitute the Statement of Evidence for the purposes of this appeal, and that the same may be received without further amendment, defendant hereby consenting to the immediate approval of said Statement of Evidence by the court and hereby waiving the period allowed under the rules in which to make objection and/or present amendments.

E W SHEPARD
Solicitor for Plaintiff-Appellant.
R. F. WHITEHEAD
Solicitor for Defendant.

33 In the Supreme Court of the District of Columbia

Equity No. 56,888

ROBERT E. CRAMER, *Plaintiff,*

vs.

CONWAY P. COE, Commissioner of Patents, *Defendant.*

Stipulation of Exhibits

It is, this 18th day of June, 1936, hereby stipulated and agreed by and between the parties hereto, through their respective solicitors, that the following mentioned paper exhibits, which were offered in evidence during the trial of this cause, shall be attached to and made, and considered to be a part of the Statement of Evidence for the appellant, and shall be treated as having been incorporated in said Statement of Evidence. The papers are as follows:

1. Plaintiff's Exhibit 1, certified file and wrapper of Plaintiff's patent application, Serial No. 445,441.

2. Plaintiff's Exhibit 2, blue print D-446, American Steel & Wire Company, Allentown Works'.

3. Defendant's Exhibit No. 1 (comprising)

   A. U. S. patent 205,764 to Reynolds

   B. U. S. patent 288,150 to Aiken

   C. U. S. patent 1,611,632 to Cantoni

   D. Article by Hadfield in "Royal Society of London", (A), Vol. 123, pp. 184-185.

   E. Prints of Plaintiff's Patent Application Drawings

   F. Examiner's Statement

   G. Decision of Board of Appeals.

E W SHEPARD
Solicitor for Plaintiff.

R. F. WHITEHEAD
Solicitor for Defendant.

34 Def. Ex. 1

Cramer vs. Coe.

Equity No. 56,888.

A—Reynolds, 205,764

B—Aiken, 288,150

C—Cantoni, 1,611,632

D—Article by Hadfield in "Royal Society of London", (A), Vol. 123, pages 184 and 185.

E—Prints of Drawings,

F—Examiner's Statement,

G—Decision of Board of Appeals.

(Here follows pages 35 to 44 inclusive.)

* * * * * *

184 *Penetration of Hydrogen into Metal Cathodes.*

range very appreciably as to make the results erratic.
45 It has also been found by direct experiment that a
tool mark having a depth equal to the thickness of the nickel deposit and sharp at the bottom, lowers the fatigue range in bending by the same amount, approximately, as the nickel deposit. The question arises whether the lowering of the stress by the deposit can be attributed to initial stresses in the deposited material, to the surface condition of the specimen or to occluded hydrogen.

It can safely be stated from the results of the tests already detailed that occluded hydrogen does not lower the range, while a sharp tool mark, which certainly concentrates the stress, lowers the repetition stress to a similar amount. It, therefore, seems clear that the nickel is deposited under stress or acts as a discontinuity like the tool mark or a crack is first produced in the deposited nickel.

Fig. 15 (Plate 14) shows a specimen tested in the direct stress machine. The specimen cracked as shown and stopped the machine. The fracture is almost normal to the axis of the specimen and is not very different from a fracture of nickel or of mild steel. The longitudinal crack suggests transverse stress in the deposit.

UNITED STATES PATE

WILLIAM L. REYNOLDS AND CALVIN HASKELL,

IMPROVEMENT IN MANUFACTUR

Specification forming part of Letters Patent No. **205,764**, dated
April 8, 1878.

To all whom it may concern:

Be it known that we, WILLIAM L. REYNOLDS and CALVIN HASKELL, residents of St. Louis, Missouri, have made a new and useful Improvement in the Mode of Devitriolizing Wire and other forms of Iron and Steel, of which the following is a full, clear, and exact description.

In the manufacture of wire it is customary, after the wire is annealed, to place it in a bath of diluted vitrol for the purpose of removing the scale, dirt, and any foreign matter that may be upon it. The wire becomes very brittle from being in the vitriol-bath, probably owing to the absorption, by the wire, of hydrogen generated during the chemical reaction which takes place when the wire is immersed in the acid; and to toughen it again, and to neutralize and speedily remove the effect of the hydrogen, it is the practice to subject the wire subsequently to a treatment that devitriolizes it.

Two devitriolizing processes have commonly been used—the hot-air process, which consists in exposing the wire for six or seven hours to air heated to 200° or 300°, and the cold-water process, which consists in soaking the wire for two or three days in cold water.

The first-named process is objectionable, in that it requires considerable time, and the wire, after undergoing it, has frequently to be cleaned again. The last-named process is also open to serious objection, because of the great length of time needed for its completion.

The present invention is an improvement upon the processes referred to. Much less time is require
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Witnesses:
CHAS.
GEO. B

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UNITED STATES PATENT OFFICE.

BENJAMIN F. AIKEN, JR., OF MILLBURY, ASSIGNOR OF ONE-HALF TO
CHARLES W. NEWHALL, JR., OF WORCESTER, MASS.

WIRE OR METAL CLEANING BATH.

SPECIFICATION forming part of Letters Patent No. 288,150, dated November 6, 1883.

Application filed April 3, 1883. (No specimens.)

To all whom it may concern:

Be it known that I, BENJAMIN F. AIKEN, Jr., a citizen of the United States, residing at Millbury, in the county of Worcester and State of Massachusetts, have invented a new and useful Improvement in Wire and Metal Cleaning Baths, of which the following is a specification, containing such a full, clear, and exact description as will enable any one skilled in the art to use the same.

My improved cleaning-bath may be used for cleaning metallic surfaces of oxides or foreign substances; but it is especially adapted to and valuable for cleaning wire or wire rods, either preparatory to their being drawn or preparatory to their being coated with zinc, tin, copper, or other metal, or for other purposes.

In the successive processes of drawing wire the iron becomes fibrous and requires to be annealed to render it ductile, and in the operation of annealing its surface becomes more or less covered with an oxide scale, which must be removed before the operation of drawing can be continued. This is commonly done by immersing the wire in a hot bath of diluted sulphuric acid for a short time, and then checking the action of the acid upon the metal, or "devitriolizing" it, by immersing the wire in a bath of hot water or subjecting it to a current of cold water; otherwise the excessive action of the acid bath would render the wire brittle and unfit to be drawn. The wire or wire rods are then coated or covered with a paste of meal or flour, clay, or a solution of salt or of lime, or of salt and lime, either alone or in connection with oil or fatty substances, which act as lubricants to the surface of the wire as it passes through the die-plates.

I use, instead of the bath of dilute sulphuric acid above mentioned, a bath formed by adding to water a cleaning corrosive acid. In case the wire is to be drawn I use sulphuric acid. In other cases—such as when coating with zinc or tin—hydrochloric or nitromuriatic acid may be used, and to the acid and water I add cyanogen, generally and for convenience in the form of a metallic cyanide. In practice I prefer the cyanide of potassium, and to each gallon of water I use from one to eight ounces of sulphuric acid, and from one-eighth of an ounce to one ounce of the cyanide of potassium. The condition and size of the wire and other varying circumstances render it impossible to state the exact strength of the bath required or the exact proportion of the several ingredients suitable under all the varying conditions of use; but these can be readily ascertained and determined by any one skilled in the art as the occasion demands.

By the combination, with an acid cleaning-bath, of cyanogen in the form of a soluble metallic cyanide I increase the efficiency of the acid bath and effect a great saving in the cost of cleaning. I also obviate to a considerable extent the injurious results of the excessive action of the sulphuric-acid bath in rendering the iron brittle, arising either from the absorption of free hydrogen or from other causes. A coating of ferro-cyanide is also formed upon the surface of the wire, which in some cases may enable it to be drawn one or more times without the use of the flour, clay, salt, or lime coating commonly employed, and in case such a coating is used the ferro-cyanide coating formed in the bath will aid in the lubrication of the wire.

The employment of a ferro-cyanide coating or covering as a "lubricant" in the process of wire-drawing, although considered new and useful, I do not herein claim, deeming it advisable to make such a use the subject of a separate application.

I apply heat to the cleaning-bath by either heating it in a kettle or by introducing a steam-jet, or by any known and convenient method. If, however, a steam-jet is used, the bath will undergo a constant dilution, owing to the condensation of the steam, which may be easily provided for, as is now done in the case of the sulphuric-acid bath. After the immersion of the wire a sufficient length of time, which will vary according to the condition and size of the wire, I check the action of the bath by subjecting the wire to a current of cold water, or by the use of any of the known means for the purpose. In some cases the bath may preferably be used cold.

For greater convenience in using the cleaning-bath herein described, I prefer, instead of employing the several ingredients separately, to use a solution of the acid and the cyanide, which will then only require the proper dilution with water to render it adaptable for use.

I am aware that a solution of the cyanide of potassium has been long in use as a menstruum or solvent solution for various metals in the process of electro-deposition. Such an application I do not claim; but

What I do claim as my invention, and desire to secure by Letters Patent, is—

1. The improved wire or metal cleaning bath herein described, consisting of a mixture, with a sulphuric-acid bath, of the cyanide of potassium, as described, and for the purpose set forth.

2. The improved wire or metal cleaning bath herein described, consisting of a mixture, with a sulphuric-acid bath, of a soluble metallic cyanide, as described, and for the purpose set forth.

3. The improved wire or metal cleaning bath herein described, consisting of a mixture, with a suitable acid cleaning-bath, of a soluble metallic cyanide, as described, and for the purpose set forth.

BENJ. F. AIKEN, JR.

Witnesses:
R. B. FOWLER,
MIRICK H. COWDIN.

Dec. 21, 1926. 1,611,632

J. D. CANTONI

DRYING APPARATUS

Filed Nov. 3, 1925 4 Sheets-Sheet 1

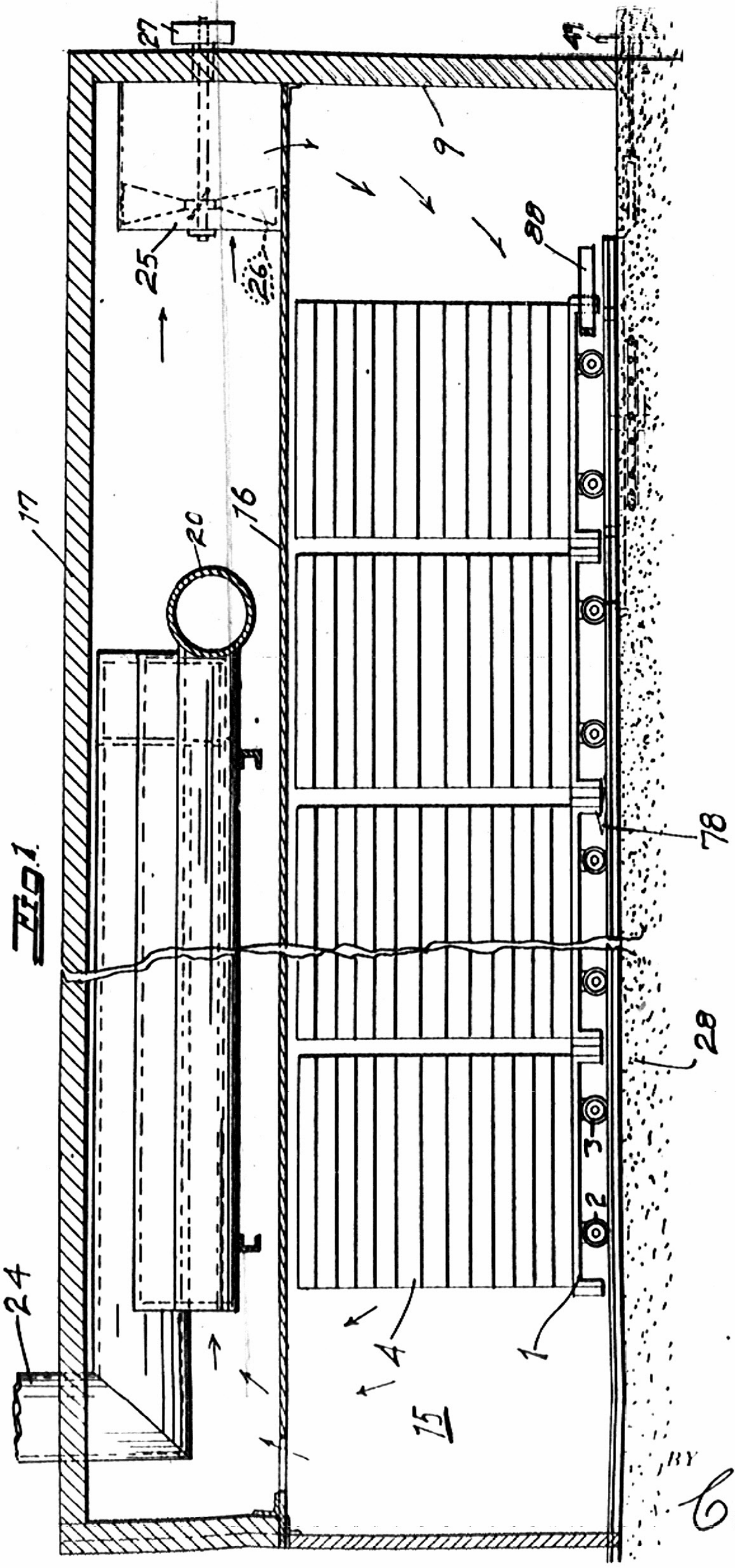


Fig. 1.

INVENTOR.
John D. Cantoni.
BY
Carlos P. Griffin
ATTORNEY.

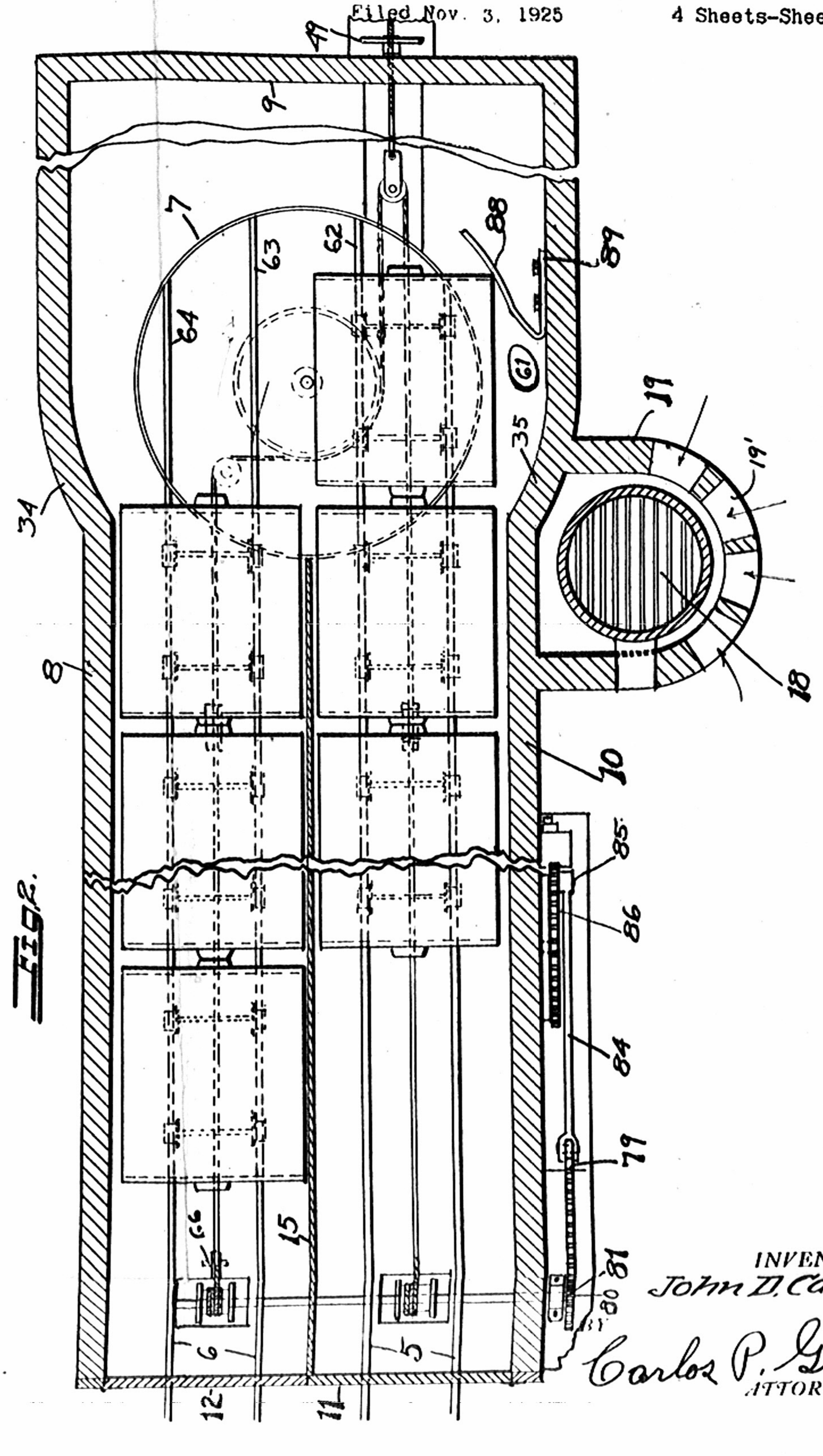
33

Dec. 21, 1926. 1,611,632

J. D. CANTONI

DRYING APPARATUS

Filed Nov. 3, 1925 4 Sheets-Sheet 2



INVENTOR.
John D. Cantoni.

BY Carlos P. Griffin
ATTORNEY.

Dec. 21, 1926. 1,611,632

J. D. CANTONI

DRYING APPARATUS

Filed Nov. 3, 1925 4 Sheets-Sheet 3

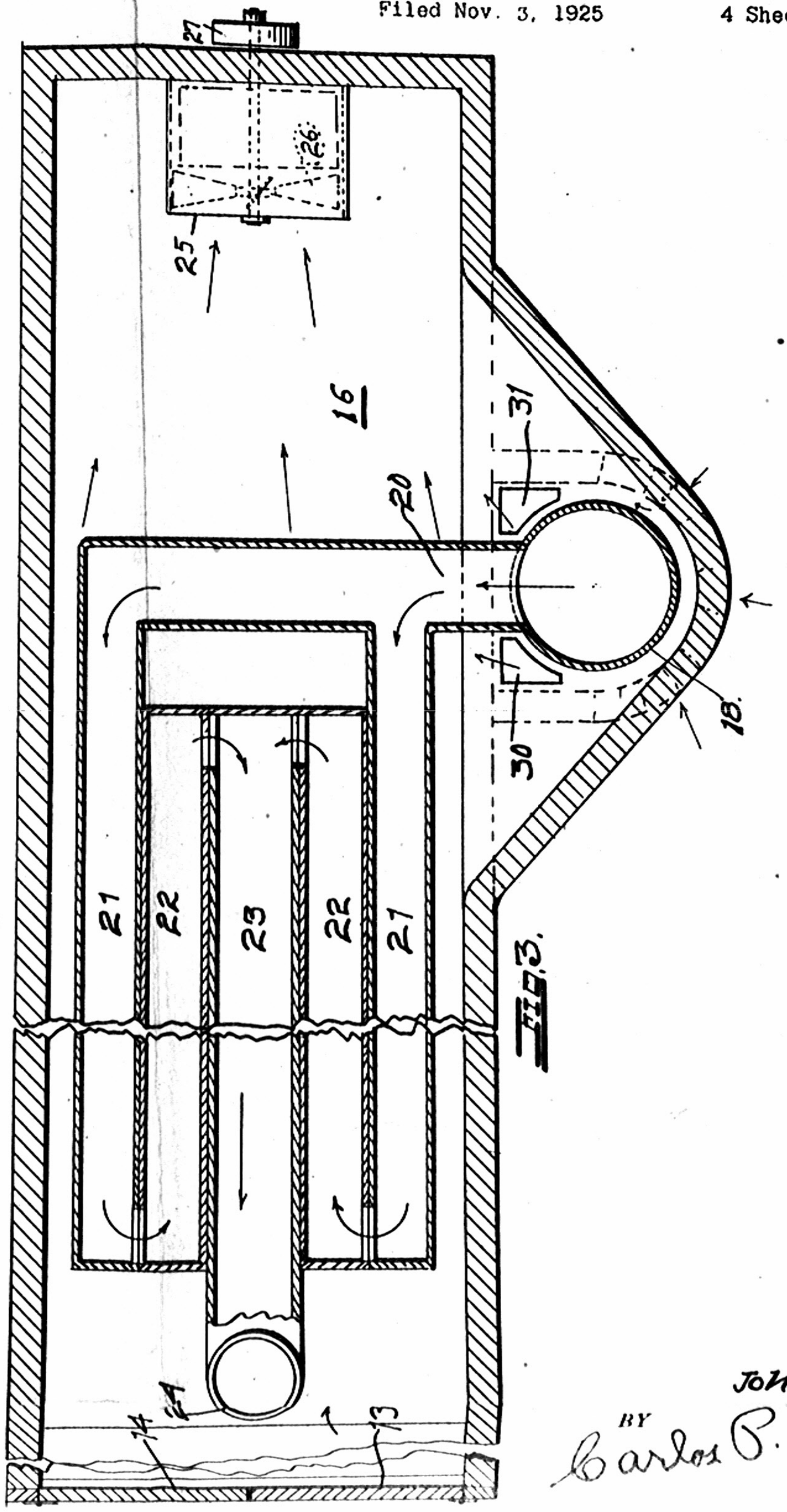


FIG. 3.

INVENTOR.
John D. Cantoni

BY Carlos P. Griffin
ATTORNEY.

Dec. 21, 1926. 1,611,632

J. D. CANTONI

DRYING APPARATUS

Filed Nov. 3, 1925 4 Sheets-Sheet 4

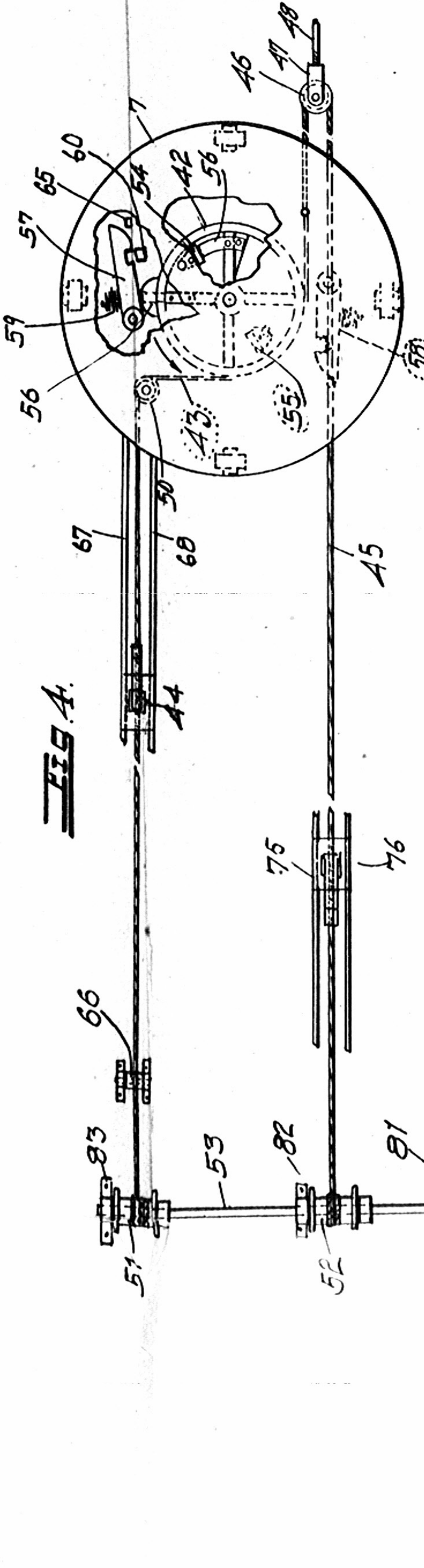


Fig. 4.

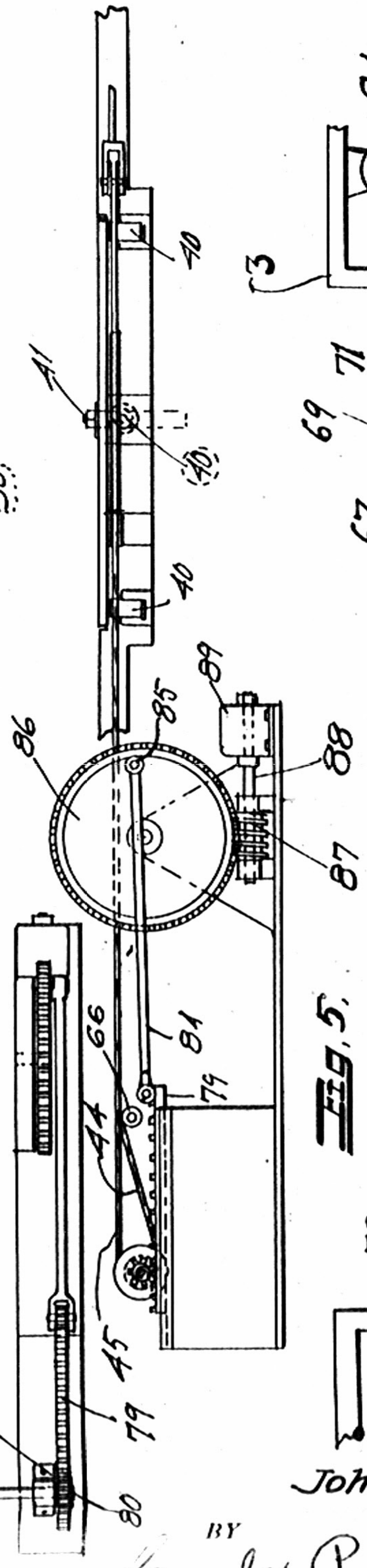


Fig. 5.

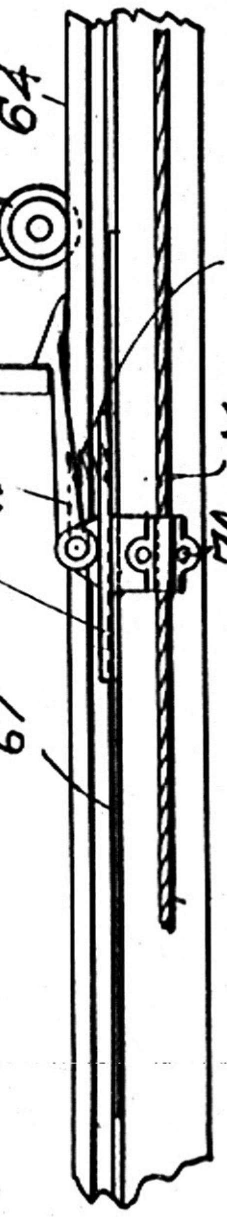


Fig. 6.

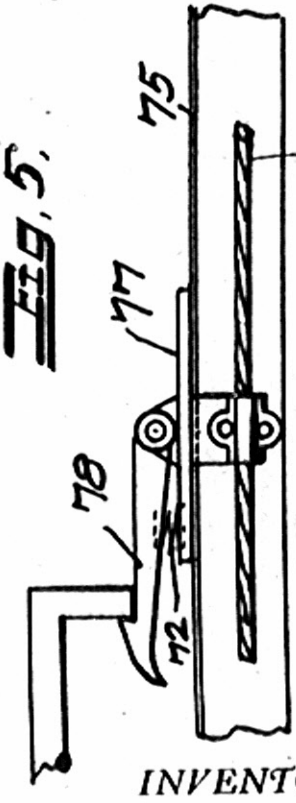


Fig. 7.

INVENTOR.
John D. Cantoni

BY
Carlos P. Griffin
ATTORNEY.

Patented Dec. 21, 1926. **1,611,632**

UNITED STATES PATENT OFFICE.

JOHN D. CANTONI, OF NAPA, CALIFORNIA.

DRYING APPARATUS.

Application filed November 3, 1925. Serial No. 66,449.

This invention relates to an apparatus for drying fruits and vegetables, and its object is to produce a drier which will be so formed as to deliver the hot air to the fruit or vegetables at a time when the materials can best withstand the greatest heat and to lead up to and away from that particular stage in such a way as to produce the best quality of dried materials.

It will be understood by those skilled in the art that in the earliest stages of the drying, the temperature must not be too high, but that during an intermediate stage of the drying, the temperature can be considerably higher without injuring the fruits or vegetables, but that during the latter stages of the drying, the temperature must be again somewhat lower, so that in the present instance, the drying chambers are so arranged as to have the fruit move from the cooler end of the drier to the hotter end, and then to have the cars containing the trays turned around and moved in another channel away from the hottest part of the drier to the cooler portion thereof until the end of the treatment.

A further object of the invention is to provide means whereby the movement of the cars along the drying tracks and on to the turn table and out of the drier, will be accomplished by the mere operation of a power driven cable.

Another object of the invention is to provide means whereby the furnace can be located outside of the main walls of the drier while the smoke flues are arranged inside the upper portion of the drier in such a way as to prevent the escape of any smoke in the two drying chambers, and provision is also made for permitting the escape from the drying chamber of a certain amount of air to insure the removal from the drier of moisture carried by the materials being treated, freshly heated air being taken into the drier from the space around the furnace.

An embodiment of the invention is shown in the accompanying drawings in which the same reference numeral is applied to the same portion throughout the several figures of the drawings and of which there may be modifications.

Figure 1 is a vertical sectional view of the complete drier.

Figure 2 is a plan view of the complete drier, the plane of section being taken to show the cars for the trays.

Figure 3 is a plan view of the drier in section showing the upper chamber of the drier and illustrating the portion of the smoke flues.

Figure 4 is a plan view of the mechanism for driving the cars in to the drier and out of it, and for turning the cars around.

Figure 5 is a side elevation of the driving mechanism.

Figure 6 is a side elevation of the hook for pulling the cars off the turn table and pushing the entire line of cars out of the drier, the movement taking place one car at a time.

Figure 7 is a side elevation of the hook for pulling the cars into the drier and on to the turntable.

This drier is intended to be of a size to take a series of cars illustrated at 1, which are supported by four wheels indicated at 2 and 3, and upon which are placed stacks of trays 4, the number of cars being dependent upon the length of the tunnel used and the capacity of the drier desired. The cars run upon two sets of tracks 5 and 6 and they are turned around inside the drier upon a turn table 7 in a manner later to be described. The walls 8, 9, 10 form a somewhat rectangular structure provided with four doors 11, 12, 13 and 14 at one end of the structure, while the drying tunnels are separated from each other by a partition 15, which extends to the turn table and the tunnels are covered over by the horizontal partition 16, while above that is the outside cover, or roof 17. The outside walls of the drier are made sufficiently thick to prevent the loss of undue heat, and at one side of the enclosure near the turn table is placed the furnace 18. The furnace is enclosed by a separate wall of its own as indicated at 19, and the pipe 20 extends up into the chamber above the drying tunnels and discharges through a series of heater flues 21 to 23, finally reaching the smoke pipe 24. At one end of the structure there as a casing 25 within which is mounted the fan 26 driven from a pulley 27 outside the main structure. The arrangement of the ceiling 16 is such that the fan discharges the air downwardly into the two drying tunnels, and at the opposite end of the tunnels it is drawn upwardly through a pair of openings in the ceiling 16 to be circulated over and under the smoke flues 21 to 23 to be re-heated. The structure rests upon a suitable concrete floor, or base, 28, and said floor also forms the support for the turn table 7. It will also be seen that there are two holes 30, 31, in the ceiling 16 where it extends over the furnace 18, the object being to allow a certain percent of fresh air to pass into the tunnels through the holes 19′ and from the space surrounding the heater and be thereby heated while the doors 13 and 14 are allowed to be open sufficiently to cause the discharge from the drier of sufficient air to carry away moisture. It will be seen that the side walls of the drier are spread slightly at 34, 35, the object being to allow the necessary space for the turning of the cars on the turn table 7. The turn table 7 rests upon a series of rollers 40 and it is held in a central position by means of a pin 41, which pin also forms the pivot for a sprocket wheel 32. The sprocket wheel 42 is engaged by sprocket chain 43 which chain is connected to the cable 44, 45, the latter passing around a take-up sheave 46, attached by means of a shackle 47, rod 48 and hand wheel 49, threaded on to rod 48 outside the structure of the drier. The sprocket chain passes around the sprocket wheel 42 and also around an idler 50. At the opposite end of the drier from the turn table the cables pass around the drums 51 and 52 respectively, each cable being wound around the drum in a reversible direction from the other so that as the shaft 53 which carries said drum is rotated, one cable will be unwound while the other one is wound upon the drum. Under the turn table there are two stops 54 and 55, which stops are engaged by a heavy spring 56 on the upper side of the sprocket wheel 42, the arrangement being such that the sprocket wheel will only turn the turn table in the direction indicated by the arrow, while said sprocket wheel is oscillating back and forth substantially 180°. It will also be seen that the sprocket wheel carries a lug 56 out of alignment with the teeth of the wheel, which is capable of engaging either one of the two pivoted latches 57, 58, carried by the under side of the turn table. The latches 57, 58 are pivotally connected to the turn table and each one has a spring as shown at 59, to hold said latches engaged with the stop 60 at the proper time, the cam 56 disengaging said latches when necessary. The said latches and a fixed stop 60 hold the turn table in the proper position to align its tracks 61, to 64 with the tracks 5 and 6 that extend down the tunnel. A fixed stop 65 prevents the latch 57 from moving more than a fixed amount under the influence of its spring 59, there being a similar stop for the latch 58. Since the cable 44 passes under its drum 51, and since those drums must, of course, be low enough to avoid interfering with the axles of the cars, the wheels of which are only 4″ in diameter, a roller 66 is provided to hold the cable 44 up to the desired level. Adjacent the turn table there are two grooved rails 67, 68 for the support of a slide 69, which slide is connected to the cable by means of a clamp 70. This slide also has a latch 71 pivotally mounted thereon which is held in the raised position by means of a spiral spring 72, and the front end of the latch is so shaped that it will pass under the flange 73 of one of the cars, and enable that car to be pulled off the turn table. Similarly there are two grooved rails 75, 76 which support a slide 77 carrying a spring hook 78 to push the line of incoming cars on to the turn table. The rotating of the shaft 53 is effected by means of a rack bar 79, which engages a pinion 80 on the end of the shaft 53, said shaft being supported in three suitable bearings 81, 82 and 83. The rack bar 79 is driven by means of a pitman 84 connected to a pin 85 on a worm wheel 86. The worm wheel 86 is driven from a small worm 87 on the motor shaft 88, said motor 89 being of any desired type. In order to prevent the cars from being pushed too far ahead on the turn table, a stiff spring 90 is secured to the wall of the structure 91 and it is shaped to the same curve as the cars will take in traveling around with the turn table, said spring being low enough to engage the cars as indicated by the dotted line at 90.

The operation of the apparatus is as follows: The tracks 67, 68 and 75, 76 are just as long as is required to move one car plus the length of the slides that operate in them. Assuming a car to be pushed into the drier on the track 5, it will be pushed in by hand until it can be caught by the hook 78, whereupon the motor 89 may be started and the drums 51, 52 will be operated to pull the car ahead its own length. Other cars will be put into the drier on the track 5 until finally one car comes against the stiff spring 88, and this will stop the entire line of cars, but upon completion of each turn of the gear 86 the turn table 7 will be turned 180° bringing one of its latches 57 or 58 into contact with the stop 60, and as soon as a car has been brought to the position on the turn table shown in Figure 2 as vacant, the next movement of the cables to bring the car into the drier on track 5 will take that particular car off the turn table on to track 6, and the operation will be repeated whenever it is desired to add another car to the drier. In the meantime, the air circulation by the fan will be drawn under and over the flue and then driven through the trays on the cars. All the time the doors 11 to 14 will be open much or little, as may be desired, to allow the escape of a certain amount of air from the drier, whereby the moisture is permitted to escape, and at the same time an equal amount of air is drawn through the openings 191 of the walls surrounding the furnace 18, but of course no smoke whatever is permitted to escape from the furnace or from its smoke flues, into the drier.

Having thus described my invention, what I desire to secure by Letters Patent of the United States is as follows, but modifications may be made in carrying out the invention as shown in the drawings and in the above particularly described form thereof, within the purview of the annexed claims.

I claim—

1. A drier of the class described, comprising a pair of tunnels side by side; means to move a line of cars into the drier through one of the tunnels, a turn table to receive the cars from said tunnel; means to turn said turn table 180° to place a car thereon in front of the second tunnel; means to move a second line of cars out of the drier through the second tunnel; means to circulate the air through both of said tunnels toward the receiving end of the drier; means to heat said air and means whereby a portion of the air circulated will be allowed to escape from the drier to remove the moisture from the materials being dried.

2. A drier of the class described, comprising a pair of tunnels side by side, doors at the inlet end of the drier, a turn table to receive cars from one of the tunnels and position them in front of the other tunnel; means to push a line of cars along one of the said tunnels on to said turn table; means to prevent the car upon the turn table from being pushed too far; means to rotate the turn table to place the car thereon in front of the second tunnel, and means to move that car, and a line of cars outwardly from the drier along said second tunnel.

3. A drier of the class described, comprising a pair of tunnels side by side, doors at the inlet end of the drier, a turn table at the opposite end of said tunnels, cables for pulling a line of cars into the drier through one of the said tunnels and for turning the turn table to bring one of the cars placed thereon to a position in front of the second tunnel and other means on said table for removing that car from the turn table and pushing a line of cars into the second tunnel out of the drier, the movement being carried out one car at a time.

4. A drier of the class described, comprising a pair of tunnels side by side, doors at the inlet end of the drier, means to take cars into the drier through one tunnel, and to remove the cars from the drier through the other tunnel, a heater means to circulate the air through both of the tunnels in the same direction, a return flue containing heater flues over which the air is returned to the circulating means, and a chamber allowing the heater open to the atmosphere and to the heating chamber containing the flues whereby a percentage of fresh air may be drawn into the drier continuously.

5. A drier of the class described, comprising a pair of tunnels arranged side by side, doors at inlet end of the tunnels, means to move a series of cars into the drier through one of the tunnels, means to shift the cars from a position at the end of the inlet tunnel to a position at the end of the exit tunnel, means to remove the cars from the drier through the exit tunnel, a fan to circulate the air in the same direction through both of said tunnels, and through a heating chamber over both of said tunnels, a heating furnace at the side of the drier, and means whereby a certain percentage of air may be drawn into the heating chamber of the drier from a chamber surrounding said furnace to compensate for air escaping from the drier charged with moisture.

6. A drier of the class described, comprising a pair of tunnels arranged side by side, with a heating chamber over both of said tunnels, a furnace, flues extending therefrom into the heating chamber, a smoke flue into which the smoke is finally discharged, doors at the inlet end of the drier for both tunnels, means to move a series of cars into the drier through one tunnel and out of the same, through the other tunnel, and means to circulate the air in the drier through both of the tunnels, and through the heating chamber, so that the hottest air will pass over the cars at an intermediate portion of the drying operation.

7. A drier of the class described comprising a walled enclosure, two pairs of rails in said enclosure, trucks on said rails, fruit drying trays on said trucks, an entrance door in said enclosure for the trucks on one of said pair of rails, an exit door for the trucks on the other pair of said rails, a turn table at the inner end of said rails, two pairs of rails on said turntable, a freely mounted sprocket-wheel on the under side of said turn table, a chain on said sprocket, a cable attached to one end of said chain and extending over an adjustable pulley to a winding drum, a cable attached to the other end of said chain and extending to another winding drum, a common shaft for said drums, means to drive said shaft, one of said drums being adapted to wind up a cable while the other is unwinding, means on said sprocket for turning said turntable in one direction, and means to stop said turntable with the rails in alignment.

In testimony whereof I have hereunto set my hand this 27th day of October, A. D. 1925.

JOHN D. CANTONI.

Conclusions.

1. Nascent hydrogen liberated at a cathode penetrates the crystal boundaries of mild steel, nickel, and "rustless" steel containing about 15 per cent. chromium and 10 per cent. nickel. The penetration does not affect the tensile strength of these materials but it lowers considerably the elongation of specimens of mild steel. The specimens exhibit transverse cracks and indicate that tearing of crystals apart at their boundaries occurs at fractures. The hydrogen clearly interferes with the slip that takes place on certain crystal planes and which, under ordinary conditions, continues apparently across the crystal boundaries.

Hydrogen escapes quickly after the current ceases even at ordinary temperatures, and after heating at 100° C. the properties of the material are restored. Highly polishing the surface of mild steel affects the hydrogen penetrating between the crystal boundaries.

2. Hydrogen in the cathode does not diminish the resistance to impact of mild steel and its effect on repeated stress seems of itself unimportant. The fractures under repeated stresses, however, show that the penetration of hydrogen has an important bearing upon the nature and form of fracture of a plastic material, which under torsional repeated stress, fails in a manner similar to quenched and tempered materials.

It would appear, therefore, that the presence of the hydrogen at the crystal boundaries does not increase the concentration of stress in the repeated stress experiments, nor in the impact tests, but affects the continuity of slip and causes a crack to occur as in the quenched and tempered materials, and suggesting that in all such materials the failure is at the boundaries while the failure of plastic materials occurs by cracking within the crystal.

A cathode specimen of mild steel under repeated direct stress in an acid bath becomes very brittle, but not in a NaOH bath.

3. Nickel plating mild steel lowers the range of repeated stress but this is not apparently due to occluded gases. As drawn nickel bar is as resistant as mild steel under repeated stresses, it would appear that either initial stresses

set up by the deposition or the discontinuity between the metals or, more likely, a crack which early forms in the deposited nickel, is the cause of the lowering of the repeated stress range .

A very small groove, perfectly sharp at the bottom, reduces the range of repetition stress to about the same extent as the nickel plating.

The Electrical Conductivity of Thin Oil Films. Part I.—*General Nature of the Phenomenon.*

By H. E. Watson, D.Sc., and A. S. Menon, M.Sc.

(Communicated by Sir William Hardy, F.R.S.—Received August 1, 1928.)

It has long been a common practice to cover accumulator terminals with vaseline; Price and others at a discussion at the Physical Society[*] mentioned that potentiometer contacts were improved by immersion in kerosene oil: Manley[†] found that the resistance of the plugs in a resistance box was invariably more constant and very nearly always lower when they were lubricated with vaseline than when they were dry; Kraus,[‡] and Melsom and Booth[§] in investigations upon contact resistances, such as switches for electrical machinery, obtained similar results. Vaseline and heavy paraffin oil are now widely used for application to plugs and sliding contacts on measuring instruments.

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[*] 'Proc. Phys. Soc.,' vol. 18, p. 49 (1903).

[†] 'Phil. Mag.,' vol. 33, p. 211 (1917).

[‡] 'Electrotechnik u. Machinenbau,' vol. 30, p. 1 (1920).

[§] 'J. Inst. Elec. Eng.,' vol. 60, p. 889 (1922).

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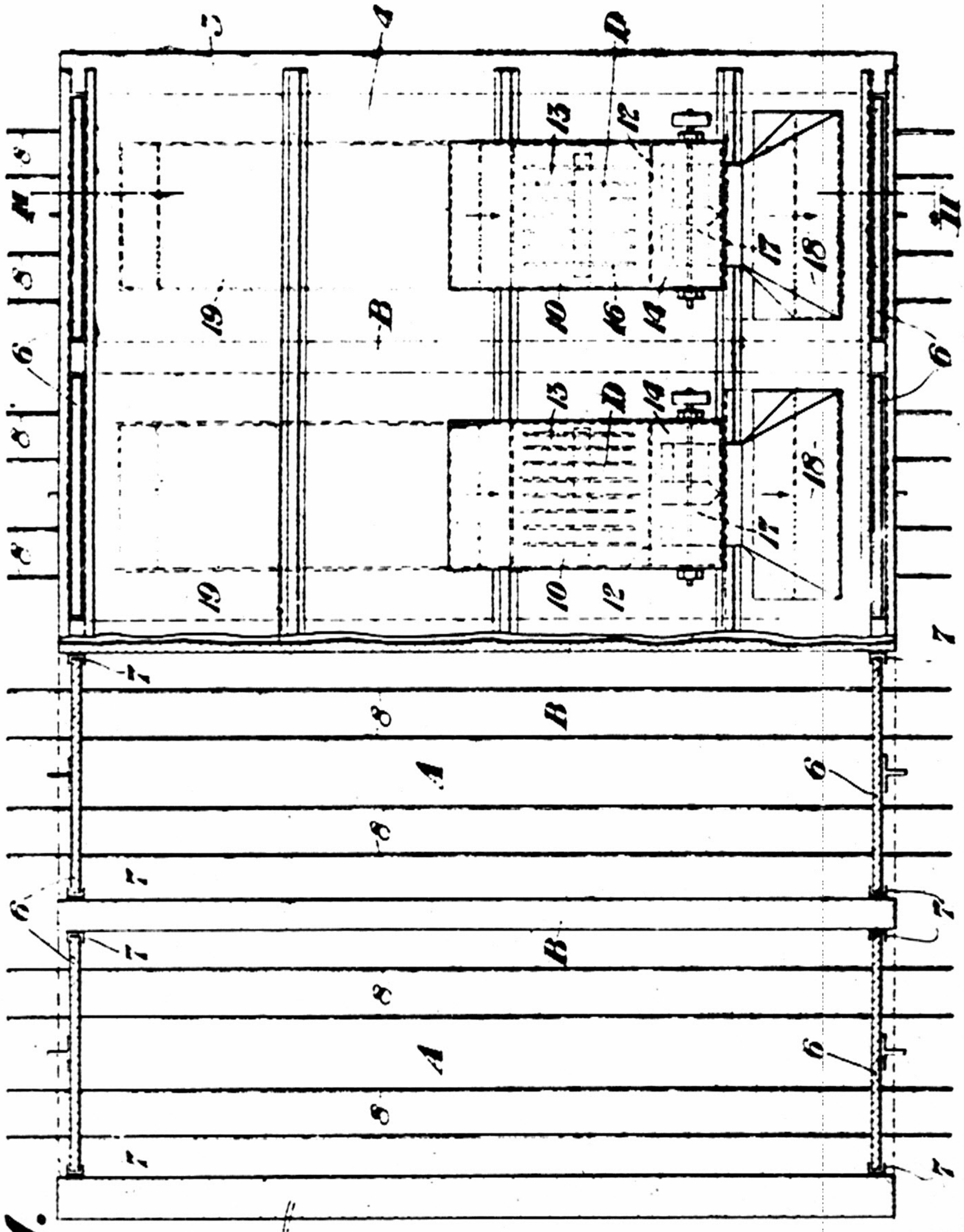

Fig. 1.

Inventor:

ROBERT F. CRAMER,

by Mauro & Rauber

his Attorneys.

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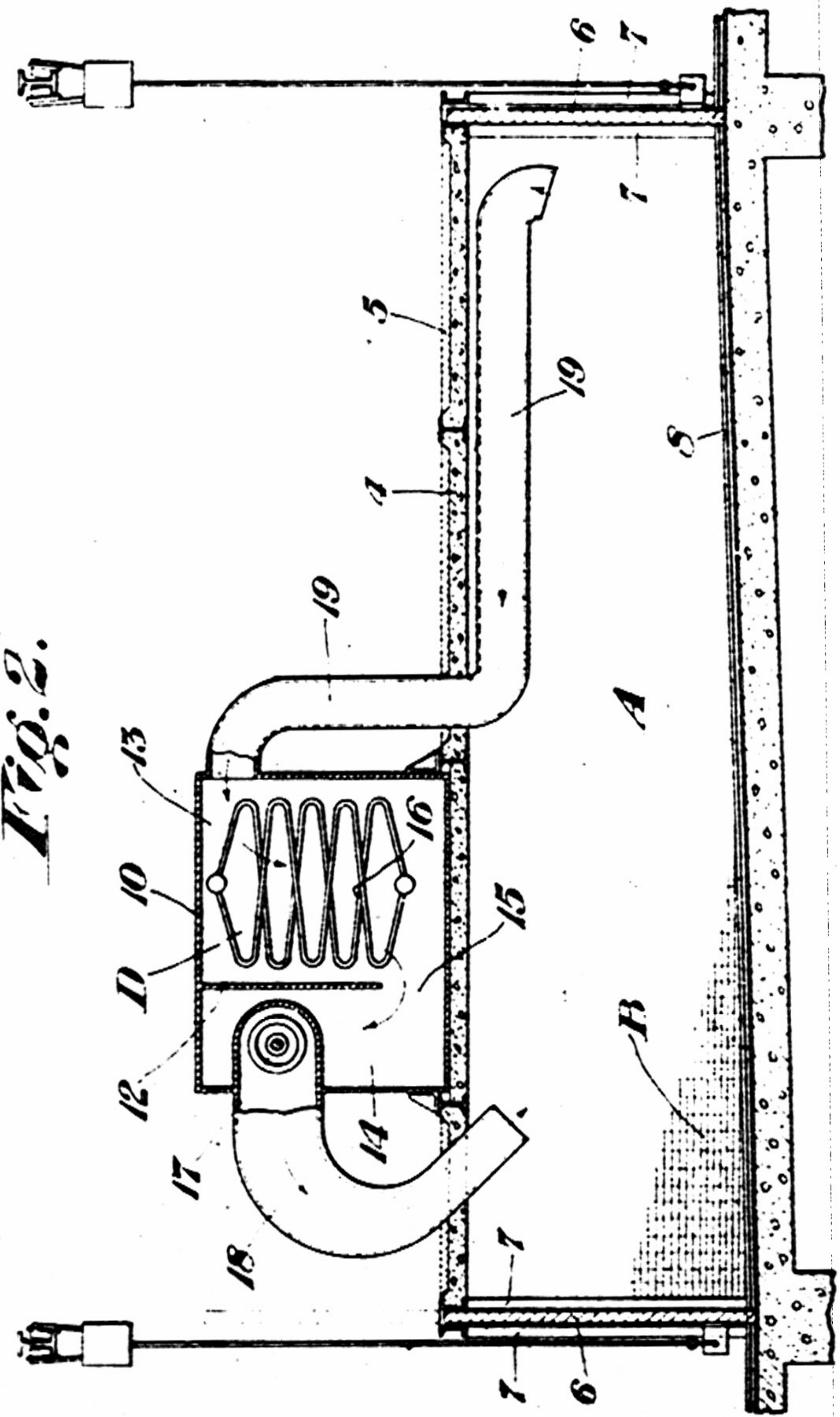
Fig. 2.



Inventor:
ROBERT E. CRAMER.
by:

his Attorneys.

51 CH:L 445,411 No. 10

June 30 1933

United States Patent Office

Before the Board of Appeals.

In re application

Robert E. Cramer,

Serial No. 445,411,

Filed Apr. 18, 1930,

Method of Treating Rods and Wire.

Examiner's Statement

This is an appeal from the action of the examiner, in which claims 1 to 5, inclusive were finally rejected. These claims read as follows:

1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

2. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and causing a forced circulation of air heated above 212 degrees Fahrenheit through the chamber.

3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212 degrees Fahrenheit and maintain it at approximately said temperatures.

4. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber

causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to at least 200 degrees Fahrenheit and maintaining said air at said temperature so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

5. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber, causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to a temperature above 212 degrees Fahrenheit and maintaining said temperature substantially constant so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

Sheet No. 2

52 Applicant's alleged invention consists of certain steps in the manufacture of steel rods and wire.

After hot working such as rolling and after annealing, steel rods and wire are covered with a coating of oxides known as scale. To remove this scale, the metal is subjected to an aqueous solution of acid (generally 5% sulfuric) to dissolve said oxides and leave the metal with a bare clean surface. The reaction of the metal with the acid produces an evolution of hydrogen some of which penetrates the metal at the crystal faces causing brittleness at least on the surface of the steel. To overcome this, applicant coats pickled rods with lime (CaO) and then heats the coated rods in a hot air drying furnace at 212° F. The air is maintained hot by recirculating it over a heater and back through the furnace chamber.

The purpose of the lime coating is to neutralize any remaining acid and to act as a lubricant in subsequent drawing.

The references relied on are:

Reynolds, 205,764 July 9, 1878 148-8

Aiken, 288,150 Nov. 6, 1883 148-8

Cantoni, 1,611,632 Dec. 21, 1926 34-46

Article by Hadfield in "Royal Society of London" (A) Vol. 123, pages 184 and 185.

Of these references, Reynolds and Hadfield are most pertinent, the former disclosing three processes for removing occluded hydrogen from wire which has been embrittled by pickling (vitriol-bath). One of these is the step of "*exposing the wire for six or seven hours to air heated to 200° or 300°*". Reynolds also mentions the neutralizing of acid subsequent to pickling in the last paragraph.

Hadfield states that the original properties of mild steel, which has been subjected to nascent hydrogen, (electrochemically produced) are restored by heating to 100° C. (212° F)

Sheet No. 3

53 Aiken shows the conventional step of liming after pickling but before drawing, which acts as a lubricant. Cantoni shows a drying apparatus (Fig. 1) having the recirculation feature claimed.

Grounds of Rejection.

Claims 1 and 2 were rejected for lack of invention over Reynolds or Hadfield.

The anticipation of these claims by Reynolds is believed to be so obvious that extended discussion is not necessary. The quoted portion of Reynolds, supra, found in lines 23-25 is believed sufficient. The temperatures are the same and both use hot air for *exactly* the same purpose. Carrying Reynold's process out in a chamber is thought to be obviously necessary.

Hadfield simply sets forth heating to 212° F for the same purpose. The use of hot air as a heating means is believed to be without invention, since this is simply one of the common methods of heating for that temperature.

Claim 3 adds to claims 1 and 2 the idea of recirculating the air with a heater in the circulating system. This claim was rejected for lack of invention over Reynolds or Hadfield in view of Cantoni on the ground that it would not amount to invention to use a hot air drying apparatus as shown by Cantoni to perform the method disclosed by Reynolds or Hadfield. No new or unobvious results have been pointed out as accruing from the added idea of recirculating the hot air and none are known to the Examiner. Certainly the use of a conventional drying apparatus does not change the Reynolds method sufficiently to be considered inventive.

Claims 4 and 5 are the most specific but merely add to claim 3 the conventional step of liming after pickling. Aiken discloses in the third (3rd) paragraph of the specification the conventional method of pickling, hot or cold water

Sheet No. 4

54 treatment, and coating with lime (CaO) to act as a drawing lubricant. This lime coat necessarily neutralizes any residual acid on the metal.

Thus it is clear that applicant's liming step is conventional and for the usual purpose. Applicant's specification page 1, lines 1-5 bears out this statement.

Attention is also called to applicant's specification, page 2, lines 18-25, which indicates that this series of steps is old in the art.

Claims 4 and 5 were rejected on the combination of Reynolds or Hadfield with Aiken and Cantoni.

Applicant's distinction over the prior art is believed solely in the use of a recirculating air drier. The only new results in the method are set out as due to uniform instead of erratic heating. As a method of treating rods and wire these claims are considered to lack invention on the ground that using a conventional drying apparatus as shown by Cantoni produces only such new results as are incidental to the apparatus and that applicant's invention, if any, is in apparatus and not in the use of it in a conventional method of treating metal.

For the above reasons and those of record, it is respectfully submitted that claims 1 to 5, inclusive, were properly rejected and should be affirmed.

NPC

Respectfully,

A. LINDSEY
Examiner, Div. 3.

55 Appeal No. 9399 Paper No. 13
Decision TM

U. S. Patent Office
Board of Appeals
Mailed Nov - 3 1933
Hearing: Oct. 19, 1933
In the United States Patent Office

Before the Board of Appeals

Ex parte Robert E. Cramer

Application for Patent filed April 18, 1930, Serial No. 445,411. Method of Treating Rods and Wire.

Messrs. Usina & Rauber for applicant.

This is an appeal from the final rejection of claims 1 to 5, inclusive.

Claims 1 and 3 are illustrative:-

1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212

Sheet 2

56 degrees Fahrenheit and maintain it at approximately said temperatures.

The references relied on by the Examiner are:-

Reynolds et al. 205,764 July 9, 1878
Aiken 288,150 Nov. 6, 1883
Cantoni 1,611,632 Dec. 21, 1926
Article by Hadfield in "Royal Society of London" (A), Vol. 123, pages 184 and 185.

The invention relates to a method of treating steel rods and wire. During the operation of rolling steel rods after annealing they become covered with a coating of oxides generally known as scale. This scale is removed by subjecting the rods to an aqueous solution of acid so as to dissolve the oxide. In this treatment a part of the hydrogen of the acid is absorbed into the surface portions of the rods. This occluded hydrogen causes brittleness of the metal so that the rods will break when they are drawn. The object of the present invention is to remove the occluded hydrogen and dry the rods after passing through the acid treatment.

The rods are coated with lime and then placed in a hot air drying or baking furnace. Hot air is constantly recirculated through the furnace and over a heater so as to keep the air constantly moving over the rods. This results in the drying of the rods and in the removal of the occluded hydrogen.

Three patents and a published article are cited by the Examiner in his rejection. The article of Hadfield discloses that occluded hydrogen can be removed from steel by heating it to 100°C.

Sheet 3

57 The Reynolds et al. patent discloses a method of devitriolizing wire. In referring to the prior practice it describes that it is customary after wire is annealed to place it in a bath of diluted vitriol for the purpose of removing scale, dirt, etc., and that this treatment results in the absorption of hydrogen by the wire. After this treatment the wire is exposed for six or seven hours to air heated to 200 or 300 degrees. It is also stated that in the prior practice the iron after being pickled in the acid bath was subsequently immersed in an alkaline bath so as to neutralize the acid.

The Aiken patent discloses a method of cleaning wire or wire rods preparatory to drawing by immersing them in an acid bath and subsequently coating them with a solution of salt or of lime.

The Cantoni patent discloses a drying apparatus which includes a chamber in which cars containing fruit or vegetables may be placed and the furnace is closed. Heated air is circulated about the fruit or vegetables and in contact with a heater, so as to quickly carry out the drying operation.

The Examiner holds that the claims are unpatentable over Reynolds when considered in connnection with Cantoni. It does not appear that any essentially new result is obtained in applicant's process over that obtained by Reynolds et al. In Reynolds et al. the air remains in a static condition as it is not circulated. The air serves to transmit heat to the wire and the occluded hydrogen is removed because of the
high temperature used. In applicant's process the
58 heated air is circulated so that it comes into contact
with all parts of the rods and the hydrogen is uniformly removed from the entire surface portion of the rods. The operation is also speeded up because the air is circulated. We do not believe that this difference is sufficient to render the claims patentable. It is so well known that where a fluid medium is used to transmit heat the operation may be speeded up by circulating the fluid. It is also well known that a more uniform heating of the articles can be obtained by circulating the fluid. Anyone skilled in the art would recognize these advantages. The Reynolds et al. patent discloses the essential steps of the process except for the circulation of the air and to employ this step would be obvious in view of Cantoni.

The decision of the Examiner is affirmed.

J. M. HOPKINS
Assistant Commissioner

W. L. THURBER
Examiner-in-Chief

P. EDINBURG
Examiner-in-Chief
Board of Appeals

Nov. 3, 1933.

Pl 2/18/36 RPB 56888 Cramer Col

390

59 DEPARTMENT OF COMMERCE

United States Patent Office

To all persons to whom these presents shall come, Greeting:

THIS IS TO CERTIFY that the annexed is a true copy from the records of this office of the File Wrapper, Contents and Drawings, in the matter of the Pending Application of Robert E. Cramer, Filed April 18, 1930, Serial Number 445,411, for Improvement in Method of Treating Rods and Wire.

IN TESTIMONY WHEREOF I have hereunto set my hand and caused the seal of the Patent Office to be affixed, at the City of Washington, this twenty-second day of October, in the year of our Lord one thousand nine hundred and thirty-five and of the Independence of the United States of America the one hundred and sixtieth.

CONWAY P. COE
(Seal) *Commissioner of Patents.*

Attest:
D. E. WILSON
Chief of Division

(Here follows photostat marked page 60)

61 $20 rec'd.
Apr 18 30
C.C.U.S.Pat.Office

Petition 445411

To the Commissioner of Patents:

Paper No: 1 Application

Your petitioner, Robert E. Cramer, a citizen of the United States, and resident of Pittsburgh (Brentwood Borough), in the county of Allegheny and State of Pennsylvania, whose post-office address is 102 Catskill Avenue, Brentwood Borough, Mount Oliver Post-Office, Pittsburgh, Pennsylvania, prays that Letters Patent may be granted to him for the certain new and useful Improvements in the

Method of Treating Rods and Wire

set forth in the annexed specification; and he hereby appoints Usina & Rauber, a firm consisting of D. Anthony Usina and Benjamin T. Rauber, of 516 Washington Loan & Trust Building, Washington, D. C., his attorneys, with full power of substitution and revocation, to prosecute this

PATENT NO.

1145411

1930

DATED

Div. 3

(EXR'S BOOK) 223/6 V

ROBERT E. CRAMER

of BRENTWOOD, PITTSBURGH

State of PENNSYLVANIA

Invention

METHOD OF TREATING RODS AND WIRE

Division of App. No. ______ Filed ______

ORIGINAL		RENEWED
APPLICATION FILED COMPLETE	APR 18, 1930	
PARTS OF APPLICATION FILED: Petition, Specification, Oath, First Fee $30, 2 sheets Drawings,	APR 18, 1930	
Examined and passed for Issue	, 193	Reexam'd and passed for Issue ______, 193
Exr. Div.		Exr. Div.
Notice of Allowance	, 193 By Commissioner.	Notice of Allowance ______, 193 By Commissioner.
Final Fee	, 193	Final Fee ______, 193

Attorney USINA & RAUBER 516 LOAN & TRUST BLDG CITY

Associate Attorney

No. of Claims Allowed ______ Print Claims ______ in O. G. Class ______

Title as Allowed

application, to make alterations and amendments therein, to receive the patent, and to transact all business in the Patent Office connected therewith.

ROBERT E CRAMER

62 *Specification*

To All Whom It May Concern:

Be it known that I, Robert E. Cramer, a citizen of the United States, and resident of Pittsburgh (Brentwood Borough), in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in the

Method of Treating Rods and Wire

of which the following is a specification.

This invention relates to a method of treating rods and wire and more particularly to a novel method of baking previously pickled or cleaned and lime-coated rods to remove occluded hydrogen and to dry the lime coating, and has for its object the provision of a novel method whereby the baking may be done under controlled conditions with high temperatures so as to quickly and completely remove all the occluded hydrogen and dry the lime coating.

Wire is drawn in a cold state from previously prepared raw material, known as rods, which are produced by hot rolling. The hot rolled rods have a scaled surface which prevents successful cold drawing. This scale, therefore, must be removed and is commercially done by a cleaning step known as pickling. Commercial pickling is practiced by immersing the rods in a hot solution or bath of water and acid. After the rods are pickled, the rods are dipped or immersed in a lime solution or bath to form a lime coating which prevents rusting, neutralizes the acid, and serves as a lubricant and protective coating in the subsequent cold drawing operations.

63 The cleaning or pickling and lime coating of the rods is necessary to successful wire production, but these operations, however, introduce two factors which are detrimental to the wire drawing operation and which must be removed before the wire can be drawn.

The two factors detrimental are occluded hydrogen in the rods, known in the art as "acid brittleness" and the wet lime coating which must be thoroughly dried.

When the steel rods are pickled in an acid solution, a part of the hydrogen from the acid is absorbed into the surface of the steel. To the industry this phenomenon is known as "occluded hydrogen" or "acid brittleness", the latter term resulting from the fact that rods or wire which have not had the hydrogen removed are so brittle that they will break when an attempt is made to draw them.

The occluded hydrogen is removed and the lime coating dried in a single operation known as baking.

Heretofore, the baking operation has generally been carried out in a more or less haphazard way in ovens or chambers heated indirectly by the burning of fuel and the passage of the products of combustion through sub-floor and overhead flues, the heat being radiated into the oven from the flue walls. Variations of the flue arrangements have been used but in every instance the heating is done by radiation and no attempt has been made to circulate the air in the oven or baker.

Ovens or bakers constructed and operated as above have varying temperatures at different points, since the zones closest to the flues or directly over the firing pits are generally hottest, the stagnant atmosphere hinders the drying operation, and it is not unusual to find variations of from 150 degrees to 200 degrees Fahrenheit in the temperature of different parts of the same oven. Other factors are also present in the prior art bakers to cause non-uniform temperatures, such as lime dust on the floor acting as an insulator, physical condition of the flues causing hot spots, etc.

Imperfect baking is obviously inherent in the type
64 of baker above described. The operator must de-
pend on his experience or memory of how a section of the baker functioned on the preceding batch. There are so many variables present which are uncontrollable by commercial methods as to lead to the characterization of this type of baker as "hit or miss" and haphazard.

It is not uncommon for operators to be compelled to rebake material which has failed to work in the wire drawing operations.

All of the above objectionable features are overcome by the present method. The time necessary to bake or dry the rods is materially reduced, and all the rods in the oven or baker are subjected to a uniform temperature and volume of circulating air so that the whole chore is uniformly treated, resulting in a uniform product completely freed of occluded hydrogen and perfectly dry.

The present method consists broadly in providing an oven chamber or compartment to receive several trucks loaded with rods or wire, and having a steam coil or other heating element and a fan arranged to recirculate the air from the oven chamber over the heating element and through the chamber. After the rods or wire are positioned in the oven chamber the fan is started to force the continued recirculation of the oven air over the heating element, thus filling the whole oven chamber with high temperature circulating air, causing a uniform temperature throughout the chamber and thoroughly baking and drying the rods or wire in a minimum of time.

65 In the drawings:

Figure 1 is a plan view partly in section showing a furnace constructed to carry out this method.

Figure 2 is a sectional view taken on the line II-II of Figure 1.

Referring more particularly to the drawings, the baker or oven as a whole is composed of end walls 2 and 3 and top wall 4 which may be of brick or other usual construction with or without a layer of insulating material 5, as desired. The back and front of the oven chamber are closed by doors 6 which are slidably mounted in guideways 7 for vertical movement to permit the charging and discharging of buggies loaded with material to be baked.

The baker is divided from front to back into sub-oven chambers A by walls B, and each sub-oven chamber is provided with tracks 8 on which the loaded buggies of material are propelled.

Each of the sub-oven chambers is provided with
66 a heating unit D mounted on top of the chamber and
composed of a casing 10 divided by a wall 12 into a heating chamber 13 and a fan chamber 14. The wall 12 is spaced from the bottom of the casing 10 to provide a port 15 between the chambers 13 and 14. A steam coil 16 or other source of heat is mounted in the chamber 13 and a fan 17 is mounted in the chamber 14. A hot air delivery conduit 18 communicates with the fan chamber 14 and extends downwardly through the top wall of the chamber adjacent the forward end thereof, and an air return conduit 19 communicates with the heating chamber 13 and extends down into the sub-chamber and along the underside of the

top wall of the sub-chamber to a point adjacent the rear end of the chamber.

In operation, the fan 17 will cause a continued recirculation of the atmosphere in the sub-chamber over the steam coil 16 so as to maintain a circulation of constant temperature air in said chamber.

Due to the constant circulation of the chamber air over the steam coil 16 the temperature of the chamber atmosphere will be uniform throughout, and the temperature is definitely fixed by the steam pressure applied to the coil. Various temperatures are possible for different classes or grades of steel and can be predetermined and maintained, as desired, merely by regulation of the steam pressure. Advantage is taken of the physical characteristics of steam which has a definite temperature for each pressure. Advantage is also taken of the fact that steam remains at constant temperature while giving up its heat. The rapid circulation of the same air over and over the steam coals quickly brings the air temperature up to that very closely approximating the steam temperature, and the forced circulation insures the same temperature at all points in the chamber.

The above conditions being assured, it will readily
67 be seen that the removal of occluded hydrogen is
brought to the highest state of perfection, with the
resulting assurance of the desired quality of product.

Exact control of each oven compartment or sub-chamber is possible by simple regulation of the steam pressure and fan speed of the heating unit of the respective sub-chambers.

The wet lime coating on the rods is dried in a minimum of time due to the rapid circulation of the air which is preferably heated to temperatures above 212 degrees Fahrenheit, at which temperature it will absorb an infinite amount of moisture.

The heat transferred from the air to the material is accelerated because of the circulation of the air. Therefore, the material reaches the desired temperature quicker than in a stagnant atmosphere and the removal of hydrogen is accelerated as well as uniformly removed.

By accelerating the hydrogen removal and lime-drying the capacity of the apparatus is greatly increased and, therefore, fewer ovens or bakers are necessary for a given output.

It will be understood that while I have shown and described a certain specific embodiment of apparatus for carrying out my novel method, that I do not wish to be limited thereto, since various modifications of the apparatus may be made for carrying out the method.

I claim:

68 1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

2. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and causing a forced circulation of air heated above 212 degrees Fahrenheit through the chamber.

3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212 degrees Fahrenheit and maintain it at approximately said temperatures.

4. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to at least 200 degrees Fahrenheit and maintaining said air at said temperature so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

5. The method of treating rods and wire that have
69 been previously immersed in an acid bath to remove
scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber, causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to a temperature above 212 degrees Fahrenheit and maintaining said temperature

substantially constant so as to bake said rods to remove occluded hydrogen obsorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

In Testimony Whereof I have hereunto set my hand.

ROBERT E CRAMER

Oath

STATE OF PENNSYLVANIA,
County of Allegheny, ss:

Robert E. Cramer, the above named petitioner, being first duly sworn, deposes and says that he is a citizen of the United States, and resident of Pittsburgh (Brentwood Borough), in the county of Allegheny and State of Pennsylvania; that he verily believes himself to be the original, first and sole inventor of the certain new and useful Improvements in the

Method of Treating Rods and Wire

described and claimed in the annexed specification; that he does not know and does not believe that the same were ever known or used before his invention or discovery thereof, or patented or described in any printed publication in any country before his invention or discovery thereof, or more than two years prior to this application; or in public use or on sale in the United States for more than two years prior to this application; that said invention has not been patented in any country foreign to the United States on an application filed by him or his legal representatives or assigns more than twelve months prior to this application; and that no application for patent on said invention has been filed by him or his legal representatives or assigns in any country foreign to the United States.

ROBERT E CRAMER

Sworn to and subscribed before me this 3rd day of April, 1930.

S L NEELY
Notary Public.

S. L. NEELY

My Commission Expires February 27, 1933. (Seal)

71 Div. 3 Room 331

260 CA:L

Paper No. 2

DEPARTMENT OF COMMERCE

United States Patent Office, Washington

Address only "The Commissioner of Patents, Washington, D. C.," and not any official by name.

All communications respecting this application should give the serial number, date of filing, and name of the applicant.

Please find below a communication from the Examiner in charge of this application. Thomas E. Robertson, Commissioner of Patents.

Applicant: Robert E. Cramer Ser. No. 445,411 Filed Apr. 18, 1930 For Method of Treating Rods and Wire.

Mailed Nov 21 1930

Usina and Rauber,
516 Loan and Trust Bldg.,
Washington, D. C.

References made of record:

Marsh, et al., 1,392,780 Oct. 4, 1921 148-8
Sanford, 1,613,726 Jan. 11, 1927 148-20
Furbush, 1,671,523 May 29, 1928 34-12
Vignon, et al., 652,867 July 3, 1900 34-19
McCann, 1,717,115 June 11, 1929 34-19
Cantoni, 1,611,632 Dec. 21, 1926 34-46
Darrah, 1,524,340 Jan. 27, 1925 237-15

Claims 1 to 5, inclusive, are rejected for lack of invention over Marsh, et al., in view of the reference to Cantoni or Vignon et al. Marsh discloses apparatus for pickling heat treated metal articles which includes an oven for drying the articles after they are removed from a rinsing bath. Cantoni and Vignon disclose a drying oven which is equipped with the heating coils and a fan adapted to force air over the coils and into or through the furnace, thus maintaining a temperature approximating that of the heating coils. Since an oven such as disclosed by the applicant is old, it would not involve invention, in view of the reference to Marsh, to use such an oven for drying or treating metal articles.

W. H. C. A. LINDSEY
Examiner

72 Division: 3 Room: 331 Applicant: Robert E. Cramer
Serial: 445,411 Filed: April 18, 1930 For: Method of Treating Rods and Wire.

2234 ASWCo

Application Div U. S. Patent Office, May 11 31
U. S. Patent Office May 12 1931 Div. 3

Pittsburgh, Pa., May 7, 1931.
Letter

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In response to Office Letter dated November 21, 1930.

A favorable reconsideration of the claims is requested.

It is true that Cantoni and Vignon disclose drying ovens for fabrics, fruit and the like and that Marsh uses a drier for drying pickled and washed sheets of metal. However, there is no disclosure in any of these references of the treatment of rods and wire to remove brittleness caused by occluded hydrogen, and as far as known applicant is the first to discover and disclose such method.

Heretofore wire and rods have been baked or dried in heated chambers or kilns generally heated by burning fuels, and the heat was radiated through the chamber walls. The chambers were closed to retain the heated air, thereby preventing circulation and the air became stagnant and charged with moisture and gases from the coating and the metal.

With the old style ovens or kilns the temperatures varied at different points in the oven as much as 200 degrees Fahrenheit, and therefore the rods and wire must be baked for a longer time than would otherwise be necessary in order to insure perfect baking of all of the material. Also, it will be apparent that heated, non-circulating air saturated or charged with moisture and gases is far less effective than the circulating air of applicant's invention.

Due to the above the old style ovens or kilns require many hours more time to bake a charge of material than applicant's method requires, and even then the quality of the finished product can not be compared with
73 the product resulting from applicant's method.

Since applicant is the first to disclose the use of circulating heated air to dry or bake rods and wire so as to provide a uniform product completely freed of occluded hydrogen and perfectly dry, which is something never before accomplished by the prior art methods, it is submitted that the claims to his method should be allowed.

An allowance is requested.

Very respectfully,

USINA & RAUBER
App. Attys

74 Div. 3 Room 331

260 CH:L

Paper No. 4

DEPARTMENT OF COMMERCE

United States Patent Office, Washington

Address only "The Commissioner of Patents, Washington, D. C.," and not any official by name

All communications respecting this application should give the serial number, date of filing, and name of the applicant

Mailed Aug-3 1931

Please find below a communication from the Examiner in charge of this application. Thomas E. Robertson, Commissioner of Patents.

Applicant: Robert E. Cramer Ser. No. 445,411 Filed Apr. 18, 1930 For Method of Treating Rods and Wire.

Usina and Rauber,
516 Loan and Trust Bldg.,
Washington, D. C.

Responsive to letter of May 11, 1931.

Additional references:

Caugherty, 1,745,403 Feb. 4, 1930 148-21.5
Naugle, et al., 1,718,063 June 18, 1929 266-7

Roy. Soc. of London (A) pub. by Harrison & Sons. Vol. 123, pages 184-185.

The above cited publication is an article by Prof. F. C. Lea, which was submitted by Sir Robert Hadfield, Dec. 13, 1928, as set out on page 171 of Vol. 123. The article will hereinafter be referred to as "Hadfield".

Claims 1 and 4 are rejected as failing to comply with R. S. Sec. 4888, for the reason that no temperature is set out rendering these claims vague and indefinite. It would require experiment even by one skilled in the art to practice the alleged invention by the method of claims 1 and 4, since the term "heated air" designates air at any temperature above room temperature.

Claims 1 to 5 are rejected for lack of invention over Marsh, Naugle, or Caugherty in view of any one of the Furbush, Cantoni or Vignon patents.

Each of the Marsh, Naugle and Caugherty patents show heating of metal after pickling the two first mentioned, to dry the stock, and Caugherty to anneal it. In each case, the sheets would be heated to more than 100° C, this temperature being necessary to dry the metal efficiently. It should be noted that Naugle drys with hot air.

75 It is contended that applicant is not the first to remove occluded hydrogen after pickling on the basis of Hadfield's article who states that the properties of the metal are restored by heating to 100° C. Whether this result was known early in pickling is quite doubtful but it is believed that it was *obtained* in the customary drying from the experimental results of Hadfield and the practice in the art.

Applicant's process then resolves to a method of heating by recirculating hot air. It is old to dry metal by hot air (Naugle) and it is held that no invention would be involved by using the method of any one of the Cantoni, Vignon, or Furbush patents for this purpose, since no new or unobvious results would be obtained.

CH per MLS WM. N. CLARK
Acting Examiner

76 Division 3 Room 331 Robert E. Cramer Serial No. 445,411 Filed April 18, 1930 Method of Treating Rods & Wire

5 2234 ASWC

U. S. Patent Office Jan 18 1932 Div. 3 Amendment A

Pittsburgh, Pa., January 11, 1932.

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In response to Office Action dated August 3, 1931.

Claim 1, line 3, cancel "heated"

Claim 1, line 4, after "air" insert — *heated to at least 200 degrees Fahrenheit and maintained*

Claim 4, line 7, cancel "a relatively high temperature" and insert — *at least 200 degrees Fahrenheit*

Claim 4, line 8, cancel "relatively high"

Remarks

Favorable reconsideration of the claims of this application is again requested.

The Examiner has rejected claims 1 to 5 for lack of invention over Marsh, Naugle or Caugherty in view of any one of the Furbush, Cantoni or Vignon patents.

A careful study of the above named patents fails to show any disclosure of baking rods and wire and, therefore, it is not apparent how such references can anticipate the claims of this application, which are directed specifically to a method of treating rods and wire to remove brittleness caused by occluded hydrogen.

The Marsh reference is for a method of pickling by a continuous method which includes washing and drying of the sheets. There is no suggestion of removing the occluded hydrogen from the sheets or other material treated by the Marsh method, nor is there any suggestion of treating the articles by a circulation of heated air such as specifically set forth in each of applicant's claims.

2234 ASWC 2

77 The Naugle reference is also for a continuous pickling apparatus. This Naugle patent has no pertinency whatever to the present invention, since there is no suggestion of heating the pickled material in any manner.

The Caugherty patent is for a method of annealing pickled sheets, and is directed specifically to a method ot stacking the sheets on a novel form of support in order to prevent sticking of the sheets during the annealing operation.

The Furbush, Cantoni and Vignon patents show various drying apparatus for fruits and the like in which heated air is circulated through the apparatus during the drying operation.

The publication entitled Roy. Soc. of London (A), published by Harrison & Sons, Volume 123, pages 184-185, discloses that nascent hydrogen will escape from a cathode when heated to 100° Centigrade. The disclosures of this publication do not teach the rod art anything that it has not known for many years, that is, that there is occluded hydrogen in pickled rods.

This application, as stated before, is limited specifically to a method of treating rods and wire which has been pickled but which has not been annealed, and the heating or pickling of the rods and wire does not change the characteristics or structure of the metal in any sense The pickling of the rods and wire to which this application relates is for the purpose of drying the lime coating on the rods so that said lime will serve as a suitable dry lubricant in the succeeding drawing operations.

The occluded hydrogen in the rods results from the pickling operation and it is necessary, in order to produce a rod which will be satisfactorily drawn, to remove substantially all of this occluded hydrogen in order that the rods would not be brittle and break under the stresses of the drawing operation.

2234 ASWC 3

78 For many years rods and wire have been *pickled in ordinary fuel*-fired ovens, *and this pickling was* for exactly the same purpose as the present invention, that is, to remove the occluded hydrogen and reduce the brittleness of the rods and dry the lime coating on the rods. For many years it has been known that the pickling operations as carried out in the fuel-fired ovens were unsatisfactory, due to the fact that uneven pickling resulted. Also, several bundles of rods from the same oven would have different drawing characteristics, due to the fact that the occluded hydrogen is more thoroughly removed from some of the bundles than others.

Many attempts have been made to regulate the heating of the prior art ovens in order to produce evenly pickled rods having substantially all the occluded hydrogen removed therefrom. However, applicant was the first to provide a method of heating such ovens in which all the rods from any given oven have the same characteristics, that is, the same lack of acid brittleness.

The Examiner states that it is his contention that applicant is not the first to remove occluded hydrogen after pickling on the basis of Hadfield's article, which states that the properties of the metal are restored by heating to 100° Centigrade.

Applicant grants that he is not the first to attempt to remove occluded hydrogen from metal articles. However, applicant does contend that he is the first to suggest a practical method of uniformly removing the occluded hydrogen from rods and wire or any other metal article by pickling said article in the manner set forth in his claims.

The Examiner has found that it is quite doubtful whether removal of the occluded hydrogen was appreciable in the early steps of the pickling art, but he believes that it was obtained in the customary drying from the experimental results of Hadfield and the practice in the art.

2234 ASWC 4

It is applicant's contention that occluded hydrogen
79 was removed in some sort of fashion when pickling
rods and wire after the manner practiced in the art for years. However, this removal of occluded hydrogen was not uniform and was unsatisfactory, while the present method is a novel advance in the art in that it provides a method of uniformly removing the occluded hydrogen from the rods or wire. Furthermore, applicant's method results in a considerable saving in time and labor, due to the fact that the time of pickling is reduced materially over that necessary in the prior art ovens, and it is unnecessary to rehandle and repickle rods, as is commonly necessary in the old prior art practice.

The Examiner has further stated that applicant's process resolves to a method of heating by recirculating hot air, and that it is old to dry metal by hot air (Naugle). It is held that no invention would be involved by using the method of any one of the Cantoni, Vignon or Furbush patents for this purpose.

Applicant admits that it is old to dry metal by hot air as in Naugle, *but applicant insists that it is novel to pickle rods or wire by the use of air and especially by the use of* circulating hot air over the rods and wire in the manner set forth in his claims.

Claims 1 and 4 have been amended to specify the temperature to which the air is heated in carrying out his method and, therefore, these claims are now thought to comply with R. S. Section 4888.

An Allowance of the claims 1 to 5 is requested.

Very respectfully,
USINA & RAUBER
Applicant's Attorneys

JEJ:S

80 Div. 3 Room 4093 CH:L Paper No. 6

Department of Commerce
United States Patent Office
Washington
Mailed May 6 1932

Please find below a communication from the Examiner in charge of this application.

THOMAS E. ROBERTSON
Commissioner of Patents.

Applicant: Robert E. Cramer
Ser. No. 445,411
Filed Apr. 18, 1930
For Method of Treating Rods and Wire.

Usina and Rauber,
516 Loan and Trust Bldg.,
Washington, D. C.

Responsive to amendment of Jan. 16, 1932.

Additional references:
Reynolds, 205,764 July 9, 1878 148-8
Aiken, 288,150 Nov. 6, 1883 148-8

Claims 1 and 2 are rejected for lack of invention over any one of the Naugle, Marsh, Hadfield or Reynolds patents.

The examiner is unable to find wherein these claims set out any new process over Naugle, Marsh, or Hadfield, of record. The patent to Reynolds is a complete anticipation showing that it is exceedingly old to expose wire for six or seven hours to air at 200-300° for the purpose of removing hydrogen.

Claim 3 is rejected for lack of invention over Hadfield or Reynolds, as above described in view of Cantoni on the ground that the recirculation of the hot air (shown by Cantoni) produces no new or unobvious results in the removal of hydrogen and consequently such a qualification of the old process lacks invention.

Claims 4 and 5 add to the other claim the feature of lime treating which is fully anticipated by Aiken, cited above, and accordingly, these claims are rejected for lack of invention over Aiken, Hadfield, or Reynolds in view of Cantoni. This combination of steps apparently produces no new results over the art due to the combination.

81 Applicant, in the last argument submitted, refers on page 3 to "pickling * * * to remove the occluded hydrogen" and again on page 4 "to pickle rods or wire by the use of air", etc. The examiner wishes to take exception to these remarks and point out that the term "pickling" as used in the metal art means only the acid or wet treatment of metal to remove scale and does not include the steps of drying or baking.

This action may be considered final for purposes of appeal if applicant so desires.

NPC

A LINDSEY
Examiner.
2234 ASWC

82 Application Div. U. S. Patent Office, Nov - 4 32
Division 3 Room 4093 Robert E. Cramer Letter #7

Serial No. 445,411 Filed April 18, 1930 Methods of Treating Rods and Wire U. S. Patent Office Nov - 5 1932

Div. 3 Pittsburgh, November 3, 1932,

Hon. Commissioner of Patents,
Washington, D. C.

Sir:

In response to Office Action dated May 6, 1932, reconsideration of the claims of this application is again requested.

The argument in the amendment dated January 11, 1932, that the claims of this are patentable over the references is again repeated.

The Marsh et al. patent No. 1,392,780 is for a method of pickling by a continuous process which includes washing and drying of the sheets.

The Naugle et al. patent No. 1,718,063 is also for a continuous pickling apparatus. This reference has no pertinency whatever to the present invention, since there is no suggestion of heating the pickled material in any manner.

The Caugherty patent No. 1,745,403 is for a method of annealing pickled sheets and is directed specifically to stacking the sheets on a novel form of support in order to prevent the sticking of the sheets during the annealing operation.

The Sanford patent No. 1,613,726 discloses a method of annealing metal which consists in excluding the said metal when at annealing heat from the atmosphere and establishing an endless stream of fluid medium, the temperature of the medium of said endless stream being lower than the temperature of said metal.

None of these references appear to be concerned with the problem applicant has overcome. This application is limited specifically to a method of treating rods and wire which have been pickled but which have *not* been annealed, and heating or pickling of the rods and wire does not change the characteristics or structure of the metal in any sense.

2234 ASWC 2

The pickling of the rods and wire to which this
83 application relates is for the purpose of drying the
lime coating on the rods so that said lime will serve as a suitable lubricant in the succeeding operations. The occluded hydrogen in the rods results from the pickling operation and it is necessary, in order to produce a rod which will be satisfactorily drawn, to remove substantially all of this occluded hydrogen in order that the rods would not be brittle and break under the stresses of the drawing operation.

Applicant is not attempting to secure claims to a continuous method of pickling which includes washing and drying of sheets, as in the Marsh and also the Naugle references, nor is he attempting to claim a method of annealing previously pickled sheets, as in the Caugherty reference. It is respectfully submitted that these references are not pertinent.

Patent No. 1,671,523, to Furbush is for an apparatus for drying wool and other textile material, and in which the machine is divided up into compartments, each one having fans or blowers for circulating the air in that compartment, and a moist air flue.

Patent No. 1,611,632, to Cantoni, is for an apparatus for drying fruits and vegetables, and its object is to "produce a dryer which will be so formed as to deliver the hot air to the fruit or vegetables at a time when the materials can best withstand the greatest heat."

Patent No. 652,867, to Vignon-Danto is for an electrical drying apparatus for treating textile fabrics and discloses a box in which the material is placed and means for circulating and recirculating the heated air through said material.

Patent No. 1,717,115, to McCann, is for a ventilating system for core ovens, and discloses an apparatus comprising means to circulate and recirculate heated air through a chamber.

ASWC 2234 3

Patent No. 1,524,340, to Darrah, is for a process
84 for applying a transferring, utilizing and controlling
heat for carrying out various industrial processes,
and more particularly as used in connection with the manufacture of dextrine from starch.

None of these references appear to be concerned in any way to a method of treating rods and wire which have been pickled but which have not been annealed and with the problem of removing brittleness caused by occluded hydrogen. It would therefore appear that the references to Furbush, Cantoni, Vignon-Danto, Darrah and McCann are non-analagous.

The publication entitled Roy. Soc. of London (A), published by Harrison & Sons, Volume 123, pages 184-185, discloses that nascent hydrogen will escape from a cathode when heated to 100° Centigrade. The disclosures of this publication do not teach the "rod" art anything that it has not known for many years; that is, that there is occluded hydrogen in pickled rods.

The Aiken patent No. 288,150 is for a lime treating method.

Patent No. 205,764, to Reynolds et al., is for a "mode of devitriolizing wire and other forms of iron and steel." This method consists in removing the wire from a vitriol-bath, and boiling it in water from two to three hours. The specification of this reference states that wire becomes very brittle from being in the vitriol-bath, probably due to the absorption by the wire of hydrogen generated by the chemical reactions which take place when the wire is immersed in the acid.

While Hadfield discloses that Nascent hydrogen will escape from a cathode when heated to 100° Centigrade, and Reynolds discloses that the absorption of hydrogen by the wire makes it brittle, there is no disclosure in either of these references of a process for eliminating this weakness that would in any way anticipate the present invention.

ASWC 2234 4

Applicant grants that he is not the first to attempt
85 to remove occluded hydrogen from metal articles.

However, he does contend that he is the first to suggest a practical method of uniformly removing the occluded hydrogen from rods and wire or any other metal article by baking said article in the manner set forth in his claims.

It is respectfully submitted that in the absence of prior art applicant's method, which consists in baking rods or wire by the use of circulating hot air over the rods and wire in the manner set forth in his claims, is patentable.

Favorable reconsideration and allowance is requested.

Very respectfully,

USINA & RAUBER
Applicant's Attorneys.

RUG:S

86 Div. 3 Room 4093 CH:L Paper No. 8

DEPARTMENT OF COMMERCE
United States Patent Office
Washington

Please find below a communication from the Examiner in charge of this application.

THOMAS E. ROBERTSON
Commissioner of Patents.

Applicant: Robert E. Cramer
Ser. No. 445,411
Filed Apr. 18, 1930
For Method of Treating Rods
and Wire
Mailed Jan 28 1933

Usina and Rauber,
516 Loan and Trust Bldg.,
Washington, D. C.

Responsive to letter of Nov. 4, 1932.

Applicant's arguments have been considered, but do not aid in overcoming the rejections which are still considered proper.

Claims 1 to 5 are again rejected on the references and for the reasons of record.

Applicant has apparently overlooked the statement in lines 23-25 of Reynolds which however was stated in the last office action. Claims 1 and 2 read directly on this.

Hadfield teaches heating mild steel to 212° F to remove occluded hydrogen which is also considered to be fully anticipatory to the claims.

The added feature of liming is exceedingly old, produces no new or unobvious results when combined with baking, and lacks invention as herein claimed.

No invention is involved by recirculating the hot air since this feature is very common in driers and produces no new results here.

Since a clear issue has been reached, this action is made final.

A. LINDSEY
Examiner.

WPC

87 Jun-12-33 767613 A—Check 15.00 ASWC 2234
Rec'd U. S. Patent Office

#9—Appeal

Division 3
Room 4093
Robert E. Cramer
Serial No. 445,411
Filed April 18, 1930
Method of Treating Rods and Wire

Mail Division Jun 12 33 U. S. Patent Office

U. S. Patent Office Jun 15 1933 Div. 3

In the United States Patent Office

Before the Board of Appeals

Appeal by Robert E. Cramer

And now this 10th day of June, 1933, comes Robert E. Cramer, by his attorneys Usina & Rauber, and appeals from the decision of the Primary Examiner in finally rejecting the claims in the above entitled application.

The reasons for appeal are that the Examiner erred in rejecting the application on the references cited and for the reasons of record.

An oral hearing is solicited.

A check for $15.00, covering the appeal fee, is enclosed.

Very respectfully,

USINA & RAUBER
Applicant's Attorneys.

Pittsburgh, Penn'a.,
June 10, 1933.

Board of Appeals Jun 13 1933 U. S. Patent Office

88 CH:L No. 10

United States Patent Office

Before the Board of Appeals

Jun 30 1933

In re application
Robert E. Cramer,
Serial No. 445,411,
Filed Apr. 18, 1930,
Method of Treating Rods and Wire.

Examiner's Statement

This is an appeal from the action of the examiner, in which claims 1 to 5, inclusive were finally rejected. These claims read as follows:

1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

2. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and causing a forced circulation of air heated above 212 degrees Fahrenheit through the chamber.

3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212 degrees Fahrenheit and maintain it at approximately said temperatures.

4. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to at least 200 degrees Fahrenheit and maintaining said air at said temperature so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and

also to dry the lime coating resulting from the lime bath.

5. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber, causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to a temperature above 212 degrees Fahrenheit and maintaining said temperature substantially constant so as to bake said rods to remove occluded hydrogen observed from the acid bath and also to dry the lime coating resulting from the lime bath.

Sheet No. 2 Serial No. 445,411

89 Applicant's alleged invention consists of certain steps in the manufacture of steel rods and wire. After hot working such as rolling and after annealing, steel rods and wire are covered with a coating of oxides known as scale. To remove this scale, the metal is subjected to an aqueous solution of acid (generally 5% sulfuric) to dissolve said oxides and leave the metal with a bare clean surface. The reaction of the metal with the acid produces an evolution of hydrogen some of which penetrates the metal at the crystal faces causing brittleness at least on the surface of the steel. To overcome this, applicant coats pickled rods with lime (CaO) and then heats the coated rods in a hot air drying furnace at 212° F. The air is maintained hot by recirculating it over a heater and back through the furnace chamber.

The purpose of the lime coating is to neutralize any remaining acid and to act as a lubricant in subsequent drawing.

The references relied on are:

Reynolds, 205,764 July 9, 1878 148-8
Aiken, 288,150 Nov. 6, 1883 " "
Cantoni, 1,611,632 Dec. 21, 1926 34-46
Article by Hadfield in "Royal Society of London" (A) Vol. 123, pages 184 and 185.

Of these references, Reynolds and Hadfield are most pertinent, the former disclosing three processes for removing occluded hydrogen from wire which has been embrittled by pickling (vitriol-bath). One of these is the step of "*expos-*

ing the wire for six or seven hours to air heated to 200° or 300°''. Reynolds also mentions the neutralizing of acid subsequent to pickling in the last paragraph.

Hadfield states that the original properties of mild steel, which has been subjected to nascent hydrogen, (electrochemically produced) are restored by heating to 100° C. (212° F)

Sheet No. 3 Serial No. 445,411

90 Aiken shows the conventional step of liming after pickling but before drawing, which acts as a lubricant. Cantoni shows a drying apparatus (Fig. 1) having the recirculation feature claimed.

Grounds of Rejection.

Claims 1 and 2 were rejected for lack of invention over Reynolds or Hadfield.

The anticipation of these claims by Reynolds is believed to be so obvious that extended discussion is not necessary. The quoted portion of Reynolds, supra, found in lines 23-25 is believed sufficient. The temperatures are the same and both use hot air for *exactly* the same purpose. Carrying Reynold's process out in a chamber is thought to be obviously necessary.

Hadfield simply sets forth heating to 212° F for the same purpose. The use of hot air as a heating means is believed to be without invention, since this is simply one of the common methods of heating for that temperature.

Claim 3 adds to claims 1 and 2 the idea of recirculating the air with a heater in the circulating system. This claim was rejected for lack of invention over Reynolds or Hadfield in view of Cantoni on the ground that it would not amount to invention to use a hot air drying apparatus as shown by Cantoni to perform the method disclosed by Reynolds or Hadfield. No new or unobvious results have been pointed out as accruing from the added idea of recirculating the hot air and none are known to the Examiner. Certainly the use of a conventional drying apparatus does not change the Reynolds method sufficiently to be considered inventive.

Claims 4 and 5 are the most specific but merely add to claim 3 the conventional step of liming after pickling. Aiken discloses in the third (3rd) paragraph of the specification the conventional method of pickling, hot or cold water

Sheet No. 4 Serial No. 445,411

91 treatment, and coating with lime (CaO) to act as a drawing lubricant. This lime coat necessarily neutralizes any residual acid on the metal.

Thus it is clear that applicant's liming step is conventional and for the usual purpose. Applicant's specification page 1, lines 1-5 bears out this statement.

Attention is also called to applicant's specification, page 2, lines 18-25, which indicates that this series of steps is old in the art.

Claims 4 and 5 were rejected on the combination of Reynolds or Hadfield with Aiken and Cantoni.

Applicant's distinction over the prior art is believed solely in the use of a recirculating air drier. The only new results in the method are set out as due to uniform instead of erratic heating. As a method of treating rods and wire these claims are considered to lack invention on the ground that using a conventional drying apparatus as shown by Cantoni produces only such new results as are incidental to the apparatus and that applicant's invention, if any, is in apparatus and not in the use of it in a conventional method of treating metal.

For the above reasons and those of record, it is respectfully submitted that claims 1 to 5, inclusive, were properly rejected and should be affirmed.

Respectfully,

NPC A. LINDSEY,
Examiner, Div. 3.

92 201-a Appeal No. 9399 Paper No. 11
Address only The Commissioner of Patents, Washington, D. C.

Notice of Hearing

Department of Commerce
United States Patent Office
Washington

July 10, 1933

Sir:

The case of Robert E. Cramer
Serial No. 445,411, will be heard by the Board of Appeals on the 19th day of October, 1933

The hearings will commence at 9.30 A. M. and as soon as the argument in one case is concluded the succeeding case will be taken up.

If any party, or his attorney, shall not appear when the case is called, his right to an oral hearing will be regarded as waived.

The time allowed for arguments is as follows:

Ex parte cases, thirty minutes;

Inter partes appeals: Interlocutory and final hearings when no testimony has been taken, thirty minutes each side; final hearing when testimony has been taken, one hour each side.

By special leave, obtained before the argument is commenced, the time may be extended.

The appellent shall have the right to open and conclude in inter partes cases, and in such cases a full and fair opening must be made.

Briefs in inter partes appeals must be filed in accordance with the provisions of Rules 144 and 163.

Respectfully,

CONWAY P. COE,
To *Commissioner of Patents.*

To
Messrs. Usina & Rauber, Attys.,
516 Loan & Trust Building,
Washington, D. C.

93 Appeal No. 9399 Paper No. 12
Brief

In the United States Patent Office

Before the Board of Appeals

In re: Application of Robert E. Cramer

Serial No. 445,411 Filed April 18, 1930

For—Method of Treating Rods and Wire

Board of Appeals Oct 19 1933 U. S. Patent Office

Brief for Applicant

This is an appeal from the final rejection of the claims in this application by the Primary Examiner.

This invention relates to a method of treating rods and wire and more particularly to a novel method of baking previously pickled or cleaned and lime-coated rods to remove occluded hydrogen and to dry the lime coating, and has for its object the provision of a novel method whereby the baking may be done under controlled conditions with high temperatures so as to quickly and completely remove all the occluded hydrogen and dry the lime coating.

The above object is attained by treating the rods with circulating or recirculating heated air. More specifically, the rods are placed in an enclosure, the air is circulated in this enclosure and certain temperatures are maintained constant throughout the enclosure during the treatment. There is no prior art teaching of the removal of hydrogen from rods by treatment in this manner.

94 -2-

The appealed claims are as follows:

1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

2. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and causing a forced circulation of air heated above 212 degrees Fahrenheit through the chamber.

3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212 degrees Fahrenheit and maintain it at approximately said temperatures.

4. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to at least 200 degrees Fahrenheit and maintaining said

air at said temperature so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

5. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber, causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to a temperature above 212 degrees Fahrenheit and maintaining said temperature substantially constant so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

95 -3-

A cursory study of these claims shows that they do not define applicant's invention as consisting of the "certain steps" described in the Examiner's statement, the parts relating to the use of acid and lime baths obviously being introductory clauses showing the invention's application, while the treatment involves the use of circulating or recirculating heated air, rather than that of just any "hot air drying furnace". Further, that while it is true that "The air is maintained hot by circulating it over a heater ", the actual dominating feature of these claims is the treatment of rods and wires containing occluded hydrogen, with circulating or recirculating heated air.

The references relied on to anticipate the appealed claims are:

Reynolds	205,764	July 9, 1878	148-8
Aiken	288,150	Nov. 6, 1883	" "
Cantoni	1,611,632	Dec. 21, 1926	34-46

Article by Hadfield in "Royal Society of London" (A) Vol. 123, pages 184 and 185.

Reynolds discloses that wire may be devitrolized, meaning the removal of brittleness caused by occluded hydrogen, by exposing it from six to seven hours to air heated to from 200° to 300°. There is no mention of whether this air is still or circulating. However, since Reynolds is discussing the prior art in this portion of his specification, there can be no doubt but what it is the same process which applicant's specification describes quite fully on the first two pages, this process being of great antiquity.

96 -4-

Hadfield adds nothing to Reynolds, being merely a technical article about metal cathodes. The Examiner relies on it because it describes heating metal to 100° Centrigrade to remove occluded hydrogen, no mention of the heating medium being made, however.

Aiken shows the conventional step of liming after pickling but before drawing, just as the Examiner states.

Cantoni does not describe a drying apparatus having the recirculating feature claimed. This feature is first recited by applicant in claim 3, where it is defined as "enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212° Fahrenheit and maintain it at substantially said temperatures". Applicant's idea is obviously to maintain temperature uniformity throughout the chamber. On the other hand, Cantoni's specification on page 1, at lines 20 and 21, reads "to have the fruit move from the cooler end of the dryer to the hotter end". It follows that Cantoni deliberately teaches that the circulating air should not be of uniform temperature throughout the drying chamber.

Now before the Examiner's application of these references to the appealed claims can be properly studied, it is necessary to know something of the prior pertinent art. Therefore, the following brief survey of the historical background of applicant's invention is given.

97 -5-

Some two hundred years ago it was discovered that wire could be more economically produced by hot-rolling billets into strands, and then cold-drawing these strands to the desired sizes through dies. At the same time it was found that the high temperatures, necessary for this rolling, caused scale to form which cut the dies. However, it was also found that these strands could be freed of such scale by immersion in an acid bath.

Although millmen were thus able to clean the strands, they immediately found that breakages frequently occurred during drawing. Various remedial expedients were tried, but the only one which ever attained any great popularity was that of baking the strands in an oven. These old-time workers believed that acid was actually imprisoned in the steel, and spoke of this process as "baking-out the acid".

These ovens consisted of tight enclosures provided with flues through which hot gases were passed, and which were arranged to radiate heat. These flues did not open into the ovens or enclosures and the rods were therefore not subjected to the effects of circulating heated air. Remember that this was the process as practiced in the early eighteen hundreds, if not before.

Now, strange as it may seem, this exact process is followed in the modern mills of today, except those which have adopted the method and apparatus of this invention, exactly the same type of ovens being used. True, they are greatly enlarged to accommodate increased production, and they are fired with gas instead of coal, but fundamentally they are still the same type of ovens. In other words, for a hundred and fifty years or more, no advance has been made in this art.

The use of the lime bath was naturally incidental to that of the acid treatment, chemical neutralization being the action sought. It was found that the lime could be left on the rods and would effectively function as a lubricant for the dies. Also, that although the lime coating might dry in the open atmosphere, baking materially accellerated it. Hence, possibly, is due the discovery of the general process under discussion. No one can be certain of these things since they were not recorded, and the details are lost in their antiquity.

However, the liming is immaterial to the present issue. The question under discussion is the elimination of acid brittleness by baking methods. It is not the drying of the lime coating, as the Examiner appears to believe.

Returing to the discussion of baking the rods, it has always been appreciated that this remedy is not reliable. Sometimes the brittleness is overcome and sometimes it remains, further baking being then required. Further, it is not always apparent only in the drawing, but may show up weeks later in the finished article. The use of this process is certainly not productive of perfect results. Reynolds shows that at least as far back as 1857 its deficiencies were realized.

Now we have applicant stepping into this practically virgin field with his invention. This consists in the drastic step of circulating the air which was always kept stagnant in these ovens. True it is that dryers have used this principle. Enamel dryers in wire mills have used it for a long time, but in the same mills every effort was made to shut up the rod-bakers against air leakage which might stir up the inside heated air. The circulation of the air in the latter was never obvious to the engineers there.

99 -7-

A further important point to note is that, although termed hot-air bakers, these ovens really heated the rods by direct heat radiation from the flues. The air was in the bakers only because it could not economically excluded, the fact that the bakers were completely closed preventing even its slight circulation. Remembering that the treatment under discussion is primarily to cure the rods of brittleness, rather than only to dry the lime coating, it becomes apparent that applicant has discovered that circulating air to carry heat directly to the rods by convection produces a perfect process.

Thus, a new result is involved, namely, the certain production of rods having absolutely no acid brittleness left in them. Applicant's invention is used by every mill of the American Steel and Wire Company. Also, a manufacturer of ovens is licensed to build units for carrying out the process. All concerned regard it as the first real advance in its art.

The issue of this appeal, then, is as follows. Embrittled rods are now, and have always, been cured by baking in a tight oven wherein there is absolutely no circulation. Dryers have used circulating air, but function as dryers only and apparently have contributed nothing to the art of freeing rods of acid brittleness. This being the state of the art, applicant has come forward with a process wherein rods are placed in an enclosure, air is circulated in this enclosure, this air is heated to the usual temperatures and this air is maintained at substantially constant temperatures throughout the enclosure.

100 -8-

With the foregoing understood, the Examiner's rejection may be studied.

Claims 1 and 2 are rejected as obviously anticipated by Reynolds or Hadfield. The first claim calls for circulating air maintained at a substantially constant temperature through the chamber, and the second calls for causing a forced circulation through the chamber. Neither of these steps is disclosed by these patentees, hence, no anticipation can be possibly predicated, much less called obvious.

Claim 3 adds the feature of recirculating the air over a heater, rather than heating the rods by radiation in the usual oven. Cantoni shows that a dryer should have a hot and cool end, whereas this claim says that the recirculated air is maintained at the temperature imparted by the heater. This is a fundamental feature of applicant's invention, this and its reason being now so apparent as to need no discussion. The prior art discussion already advanced attends to the question of the new and unobvious results involved. It also shows that the question involved is not merely the substitution of a conventional drying apparatus in connection with Reynolds' method. It is a fundamentally new process wherein rods are treated with circulating air maintained at certain temperatures, rather than a treatment with air held still and stagnant by careful and deliberate closing of all draft-creating openings.

Claims 4 and 5 are rather specific, the Examiner's rejection of these being erroneous for the same reasons as apply to the other claims.

101 -9-

Before closing, applicant wishes to particularly point out that the same Examiner handled his application throughout its prosecution, and that there has apparently never been any appreciation of the invention's true character. The idea has persisted that the invention is concerned with drying the lime coating, whereas this is but an incidental detail. Also, it should be noted that Reynolds, showing the usual treatment of rods, was not cited until the third action, when it was seized upon as a complete anticipation, in spite of the fact that applicant's specification has the entire first two pages devoted to showing that this process is old. This last shows an unfamiliarity with the fundamentals of the manufacture of wire, which possibly explains the grounds of rejection advanced.

Since Cantoni has been strongly urged as anticipatory, a final discussion of his apparatus seems in order. He apparently obtains his desired temperature differences by making his enclosure very long and his furnace comparatively small. Hence, he heats the air but slightly so that heat losses by conduction through the enclosing wall and through vaporization of the water in the fruit are quite sufficient to materially cool the air as it passes from end to end of the dryer. Applicant uses a comparatively large steam heater, heats the air to much higher temperatures than can be used for drying fruit and exhausts and injects the recirculating air at strategic points, all to the end of maintaining a substantially constant temperature throughout the chamber. The two ideas are quite different.

102 -10-

In view of the foregoing, it is respectfully requested that the Examiner's rejection of claims 1 through 5 be reversed.

Very respectfully,

USINA & RAUBER
Applicant's Attorneys.

October 19, 1933.
Pittsburgh, Pennsylvania

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103 U. S. Patent Office Board of Appeals Nov-3 1933
Mailed

Appeal No. 9399

Appeal No. 9399 Paper No. 13
Decision

Hearing:
Oct. 19, 1933

TM

In the United States Patent Office

Before the Board of Appeals

Ex parte Robert E. Cramer

Application for Patent filed April 18, 1930, Serial No. 445,411. Method of Treating Rods and Wire.

Messrs. Usina & Rauber for applicant.

This is an appeal from the final rejection of claims 1 to 5, inclusive.

Claims 1 and 3 are illustrative:—

1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212 degrees Fahrenheit and maintain it at approximately said temperatures.

The references relied on by the Examiner are:—

Reynolds et al.	205,764	July 9, 1878
Aiken	288,150	Nov. 6, 1883
Cantoni	1,611,632	Dec. 21, 1926

Article by Hadfield in "Royal Society of London" (A), Vol. 123, pages 184 and 185.

The invention relates to a method of treating steel rods and wire. During the operation of rolling steel rods after annealing they become covered with a coating of oxides generally known as scale. This scale is removed by subjecting the rods to an aqueous solution of acid so as to dissolve the oxide. In this treatment a part of the hydrogen of the acid is absorbed into the surface portions of the rods. This occluded hydrogen causes brittleness of the metal so that the rods will break when they are drawn. The object of the present invention is to remove the occluded hydrogen and dry the rods after passing through the acid treatment.

The rods are coated with lime and then placed in a hot air drying or baking furnace. Hot air is constantly recirculated through the furnace and over a heater so as to keep the air constantly moving over the rods. This results in the drying of the rods and in the removal of the occluded hydrogen.

Three patents and a published article are cited by the Examiner in his rejection. The article of Hadfield discloses that occluded hydrogen can be removed from steel by heating it to 100°C.

The Reynolds et al. patent discloses a method of devitriolizing wire. In referring to the prior practice it describes that it is customary after wire is annealed to place it in a bath of diluted vitriol for the purpose of removing scale, dirt, etc., and that this treatment results in the absorption of hydrogen by the wire. After this treatment the wire is exposed for six or seven hours to air heated to 200 or 300 degrees. It is also stated that in the prior practice the iron after being pickled in the acid bath was subsequently immersed in an alkaline bath so as to neutralize the acid.

The Aiken patent discloses a method of cleaning wire or wire rods preparatory to drawing by immersing them in an acid bath and subsequently coating them with a solution of salt or of lime.

The Cantoni patent discloses a drying apparatus which includes a chamber in which cars containing fruit or vegetables may be placed and the furnace is closed. Heated air is circulated about the fruit or vegetables and in contact with a heater, so as to quickly carry out the drying operation.

The Examiner holds that the claims are unpatentable over Reynolds when considered in connection with Cantoni. It does not appear that any essentially new result is obtained in applicant's process over that obtained by Reynolds et al. In Reynolds et al. the air remains in a static condition as it is not circulated. The air serves to transmit heat to the wire and the occluded hydrogen is removed because of the high temperature used. In applicant's process the heated air is circulated so that it comes into contact with all parts of the rods and the hydrogen is uniformly removed from the entire surface portion of the rods. The operation is also speeded up because the air is circulated. We do not believe that this difference is sufficient to render the claims patentable. It is so well known that where a fluid medium is used to transmit heat the operation may be speeded up by circulating the fluid. It is also well known that a more uniform heating of the articles can be obtained by circulating the fluid. Anyone skilled in the art would recognize these advantages. The Reynolds et al. patent discloses the essential steps of the process except for the circulation of the air and to employ this step would be obvious in view of Cantoni.

The decision of the Examiner is affirmed.

BOARD OF APPEALS

J M HOPKINS
Assistant Commissioner

W. L. THURBER
Examiner-in-Chief

P. EDINBURG,
Examiner-in-Chief

Nov. 3, 1933.

14

Address only The Commissioner of Patents, Washington, D. C.

107 Department of Commerce
United States Patent Office
Washington

Ex parte Robert E. Cramer,
Serial No. 445,411,
Filed April 18, 1930.
Method of Treating Rods and Wire.

Notice of Suit Under Section 4915 R. S.

A suit in Equity under Section 4915 R. S., entitled Robert E. Cramer vs. Conway P. Coe, Commissioner of Patents, equity No. 56,888, involving this application, was filed on March 13, 1934, in the Supreme Court of the District of Columbia.

T. A. HOSTETLER,
Solicitor.

March 13, 1934.

Endorsed on Cover: District Court of the United States, District of Columbia No. 6822 Robert E. Cramer, Appellant, vs. Conway P. Coe, Commissioner of Patents. United States Court of Appeals for the District of Columbia Filed Aug 31 1936 Moncure Burke Clerk

1930

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5. Jan 16 1932
6. Rejection MAY 6 1932
7. Nov 4, 1932
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9. Appeal to Board June 12/33
10. Exam State JUN 30 1933
HEARING OCT 19 1933
11.
12. BRIEF OCT 19 1933
DECISION BY BOARD NOV 3 - 1933
13.
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17. Not up for Action
18. Do not Hold Abandoned
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No 9356

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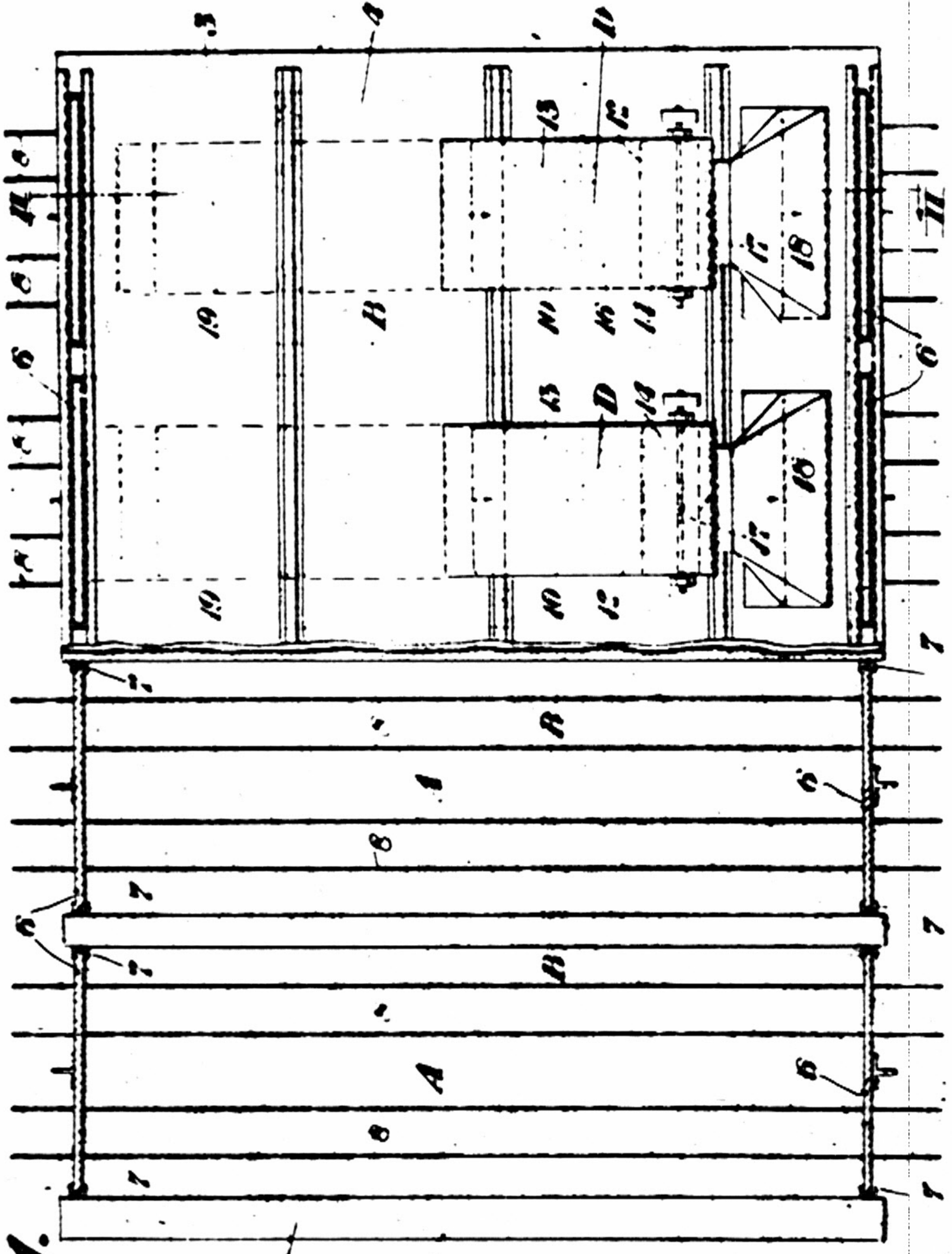
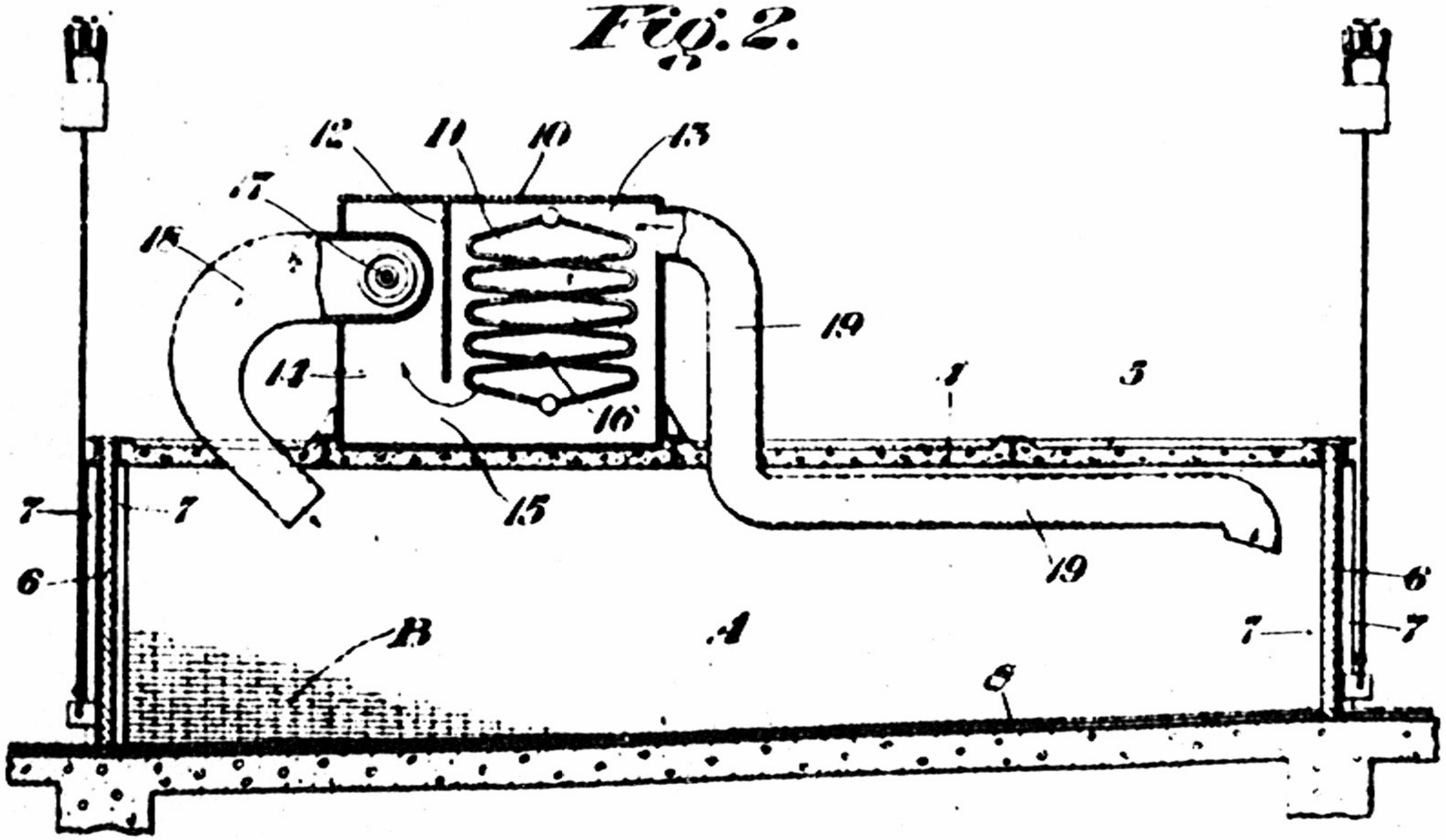
Fig. 1.



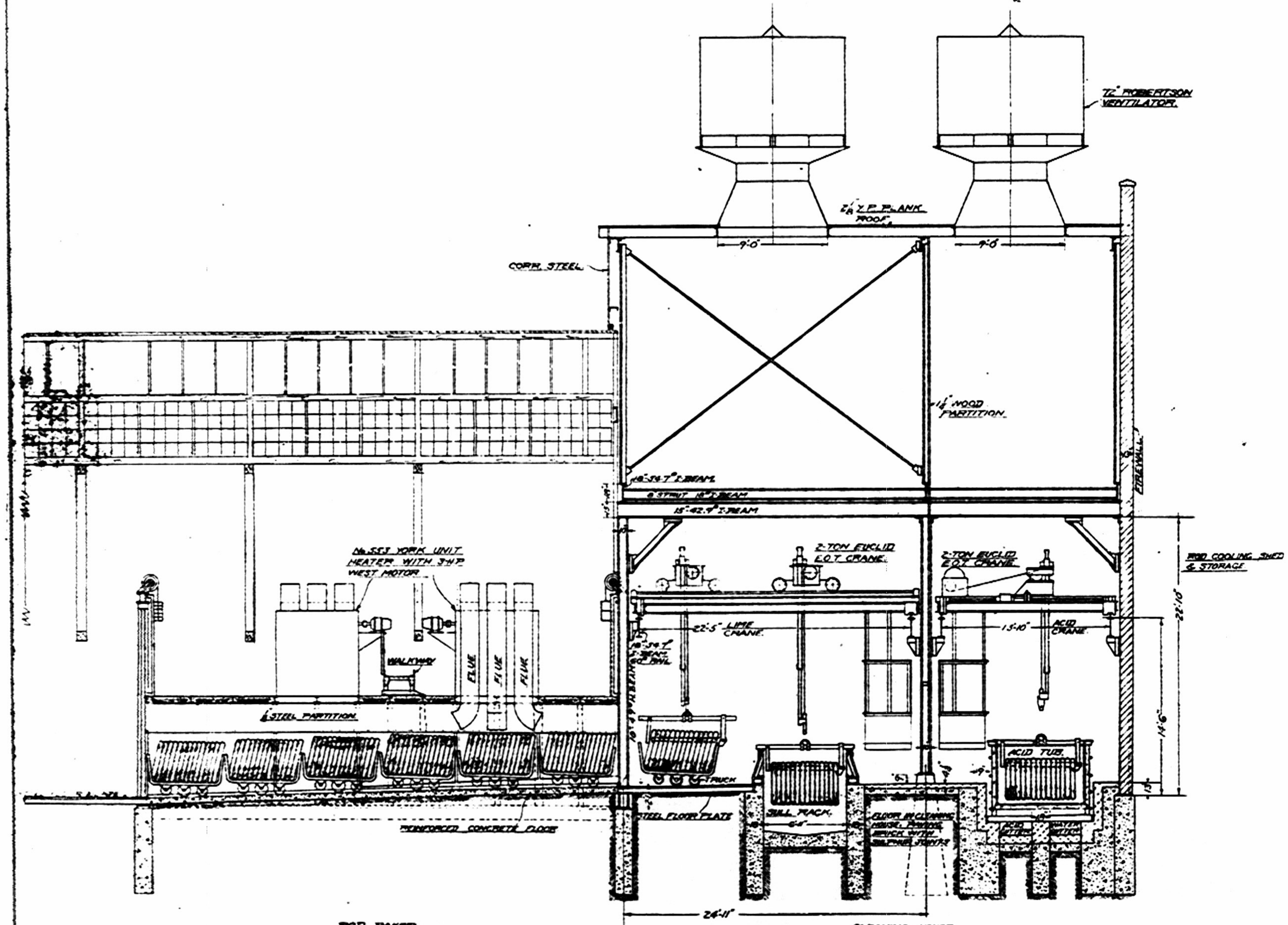
Inventor:
ROBERT F. CRIMER
by

14511

Fig. 2.



Inventor:
ROBERT F. CRAMER,
by
his Attorneys.



ROD BAKER

CLEANING HOUSE

CROSS SECTION A-A ON DRAWING No. D-442

REFERENCE DRAWINGS
D-385 YOKE.
D-391 ACID TUB
D-378 LONGITUDINAL SECTION ROD BAKER
D-415 ELEVATION & CROSS SECTION ROD BAKER
D-418 GEN. DRAWING SULL RACK
D-430 GEN. DRAWING WASH TUB.
D-442 GEN. PLAN ROD BAKER & CLEANING HOUSE.
D-447 LONGITUDINAL SECTION CLEANING HOUSE

BILL OF MATERIAL

U. S. S. NO.
DILT. NO.

AMERICAN STEEL & WIRE COMPANY

ALLENTOWN WORKS.

CROSS SECTION.

CLEANING HOUSE & ROD BAKER.

WIRE DRAWING DEP'T.

TRACED J.D.W. 12-12-29.
CHECKED BY J.J.B.
SCALE ¼"=1-FT.

D446

FOR MR. JUSTICE ROBB

IN THE

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

UNITED STATES
COURT OF APPEALS FOR THE
DISTRICT OF COLUMBIA
FILED NOV 21 1936
Monroe R. Burke
CLERK

No. 6822 April Term, 1936.

ROBERT E. CRAMER,
APPELLANT

vs.

CONWAY P. COE,
APPELLEE.

BRIEF FOR APPELLANT.

APPEAL FROM THE DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA.

E. W. SHEPARD,
D. ANTHONY USINA,
JOHN E. JACKSON,
Attorneys for Appellant.

607 Oliver Bldg.,
Pittsburgh, Pa.

BATAVIA TIMES, LAW PRINTERS,
BATAVIA, N. Y.
JOSIAH SMITH CO., PENNSYLVANIA REPRESENTATIVE,
704 SECOND AVENUE, PITTSBURGH, PA.

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CITATIONS.

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IN THE

UNITED STATES COURT OF APPEALS FOR THE DISTRICT OF COLUMBIA.

No. 6822 April Term, 1936.

ROBERT E. CRAMER,
APPELLANT,
vs.
CONWAY P. COE,
APPELLEE.

BRIEF FOR APPELLANT.

This is a suit brought by Robert E. Cramer, Appellant, against Conway P. Coe, who is Commissioner of Patents of the United States of America, under and pursuant to Section 4915 of the Revised Statutes of the United States, which provides for a Bill in Equity in case of refusal by the Commissioner of Patents to grant Letters Patent on an application duly signed and prosecuted in the United States Patent Office.

The Invention in Issue.

The Cramer invention in issue relates to a method of treating rods and wire to remove brittleness caused by occluded hydrogen, which consists in enclosing the rods or wire in a chamber and causing a circulation of air, heated to above 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

The invention is clearly described and illustrated in Plaintiff's Exhibit 1, a certified file and wrapper of plaintiff's patent application, Serial No. 445,441.

The claims which are directed to the Cramer invention and which are here in issue are:

> 1. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.
>
> 2. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and causing a forced circulation of air heated above 212 degrees Fahrenheit through the chamber.
>
> 3. The method of treating rods and wire to remove brittleness caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, recirculating air in said chamber, and passing said air over a heater during its recirculation to heat said air to temperatures above 212 degrees Fahrenheit and maintain it at approximately said temperatures.
>
> 4. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to at least 200 degrees Fahrenheit and maintaining said air at said temperature so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

> 5. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber, causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to a temperature above 212 degrees Fahrenheit and maintaining said temperature substantially constant so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

This appeal is based upon a record which is outstanding in favor of Cramer. The record shows that defendant-appellee has not contested, by cross-examination or otherwise, any portion of the evidence, and this evidence clearly shows that applicant's invention is:

1. New.
2. Novel.
3. Useful.
4. Not known or used by others before his invention or discovery thereof.

Another novel part of the present record is that the Findings of Fact admit novelty in Cramer's invention. There is not a single finding of fact against Cramer's contention that his invention is novel, new and useful.

The Honorable Court's attention is called to the fact that there is nothing in the present record before it, produced by defendant-appellee, contesting the clear statements in the record that the several prior art patents and publications relied upon by defendant-appellee fail to anticipate Cramer's invention.

Attention is called to the printed record, page 18, last paragraph, in which Cramer testified regarding the Reynolds and Haskell patent No. 205,764, Defendant's Exhibit No. 1A, as follows:

> "I see nothing in this patent that relates to my method. I do not find any disclosure in the Reynolds and Haskell patent No. 205,764 suggesting a method of treating rods and wire to remove occluded hydrogen, which consists in enclosing the rods or wire in a chamber and circulating air heated to at least 200° F., and maintaining the air at substantially constant temperature throughout the chamber."

Attention is called to page 19 of the printed record where Cramer testified regarding the Aiken patent No. 288,150, dated November 6, 1883, Defendant's Exhibit No. 1B, as follows:

> "There is no disclosure in this Aiken patent of a method of baking rods or wire in any manner whatsoever, the patent simply relating to a cleaning bath."

Attention is also called to Cramer's testimony concerning the Cantoni patent No. 1,611,632, dated December 21, 1926, Defendant's Exhibit No. 1C, appearing on page 19 of the printed record and reading as follows:

> "I now refer to the Cantoni patent No. 1,611,632, dated December 21, 1926. This patent covers a specific form of oven for drying fruits and vegetables, and comprises essentially hot and cold zones. Such a method could not be used for baking rods, as my method specifically requires temperatures of at least 200°, and uniform temperatures.
>
> "The ideas of this patent are clearly stated in the following, which I will quote:

> 'It will be understood by those skilled in the art that in the earliest stages of the drying, the temperature must not be too high, but that during intermediate stages of the drying, the temperature can be considerably higher without injuring the fruits or vegetables, but that during the latter stages of the drying, the temperature must be again somewhat lower, so that in the present instance the drying chambers are so arranged as to have the fruit move from the cooler end of the dryer to the hotter end, and then to have the cars containing the trays turned around and moved in another channel, away from the hottest part of the dryer to the cooler portion thereof, until the end of the treatment.'
>
> "Such a method could not be used for baking rods. This patent further provides for a continuous supply of fresh air to come into the dryer and the inventor states that doors 13 and 14 are allowed to be opened sufficiently to cause a discharge.
>
> "In rod baking the doors are constantly kept closed while the baking is in process. I therefore see nothing in this patent that relates to my baking of rods."

Attention is further called to page 20 of the printed record where Cramer testified in regard to the published article by Hadfield in the Royal Society of London, Volume 123, pages 184 and 185, Defendant's Exhibit 1D, as follows:

> "This Hadfield article merely discloses that steel which has been exposed to nascent hydrogen will recover its original properties when heated to approximately 100° C. or 212° F. This fact has always been known in the wire industry, and other than this well known fact, I see nothing that has any bearing on my invention."

Attention is called to the testimony of a disinterested witness, W. C. Acomb, in regard to the several prior art patents and publications, where, on page 25 of the printed record, Acomb testified in regard to the Reynolds *et al.* patent No. 205,764, dated July 9, 1878, Defendant's Exhibit No. 1A, as follows:

> "As an experienced wire mill man, I see no disclosure in this patent that would teach the method of baking which is used by Cramer."

Further, in testifying in regard to the Aiken patent No. 288,150, dated November 6, 1883, Defendant's Exhibit No. 1B, on pages 25 and 26 of the record, Acomb stated:

> "I find no disclosure in this Aiken patent which teaches me, as an experienced wire mill man, the Cramer method. This Aiken patent simply covers the introduction of some chemical into the acid, and to prevent the acid brittleness resulting from hydrogen occlusion, and it makes no reference whatever to a baking of the rods."

In testifying in regard to the Cantoni patent No. 1,611,632, dated December 21, 1926, Defendant's Exhibit No. 1C, and in regard to the published article by Hadfield, in the Royal Society of London, Volume 123, pages 184 and 185, Defendant's Exhibit No. 1D, Acomb stated:

> "I now refer to the Cantoni patent No. 1,611,632, dated December 21, 1926. I find no disclosure in this Cantoni patent of baking rods. This patent relates to the drying of fruits and vegetables.
>
> "I now refer to the article by Hadfield, in the Royal Society of London, Volume 123, pages 184 and 185. This article does not refer in any way to the baking of rods by circulating air."

The above testimony, which is absolutely uncontradicted, clearly proves novelty in the Cramer invention.

In order to prove the usefulness of the Cramer invention, the Honorable Court's attention is called to the testimony of the disinterested witness, James F. Phifer, who has been employed by the American Steel & Wire Company for over forty years, successively, as Master Mechanic, Assistant Superintendent and Superintendent of their large plants at Allentown, Pa. Mr. Phifer testified as to Cramer, appellant here, presenting his invention to him and assisting Cramer in an experiment which proved that the Cramer invention will provide a uniform temperature throughout the baker, which results not only in baking out the occluded hydrogen gas but doing it very much quicker and very much cheaper. Further, Mr. Phifer testified:

> *"It is the circulation of hot air—recirculated—which maintains the temperature throughout the whole compartment under a uniform temperature, and this was not possible under the old or former construction."*

ATTENTION IS CALLED to the fact that in the Findings of Fact before this Court it is admitted that the prior art relied upon by defendant fails to disclose or suggest a method of rod baking in which heated air is circulated or recirculated so as to maintain even temperature throughout the baker compartment. This is the novelty of applicant's method and it is included in each and every claim in his application for patent which is before this Court.

Phifer also, in his above testimony, proved the usefulness of the Cramer invention when he testified that the occluded hydrogen gas was removed very much quicker and very much cheaper. Here we have a witness whose testimony is uncontested in any way; a witness who is an expert of long experience, for over forty years in the particular art in which the Cramer invention belongs, testifying that the Cramer invention is not only novel but is new and useful. Phifer's testimony is summed up in a short manner as follows (from page 22 of the printed record):

> "From my experience since the Cramer method has been in practice, it is my opinion that the method of the Cramer application, which is the method I have described, and which is broadly expressed in the application as the method of treating rods and wire to remove brittleness caused by occluded hydrogen, which consist in enclosing the rods or wire in a chamber and recirculating air heated to at least 200° F., and maintaining it at substantially constant temperature throughout the chamber, is a decided improvement over the method of baking rods in which the air is not circulated, which method was used prior to the Cramer invention. In fact, I think the Cramer method is a very decided improvement."

The Honorable Court's attention is called to the testimony of Albert W. Trenbath, another experienced wire mill workman, a man employed by the American Steel & Wire Company at Donora, Pa., in the capacity of Wire Mill Foreman, and having under his jurisdiction wire mill bakers of the prior art. Trenbath in uncontradicted testimony states that, to his own knowledge, the old style stagnant air bakers which are unevenly heated are used generally in the industry, and that it is the general practice when production is rushed (due to the uneven heating of the bakers used generally throughout the industry) to remove the rods being baked from one end of an oven, and place them in the opposite end in an attempt to get more even baking. Trenbath further states that with some rods with which he is familiar it is necessary to bake them from ten to twelve hours and that at many times he personally has found rods that were brittle, due to occluded hydrogen, after making in these old style ovens and by the old methods known and commonly used prior to the Cramer invention; and that these acid brittle rods required rebaking before they were capable of being drawn. Contrasting to the testimony of Trenbath, relating to the prior art methods of baking commonly in use, is the testimony of Acomb, an experienced wire mill Superintendent, having over thirty-one years of experience in wire mills, who testified that the Cramer baker cost materially less than the old style baker to build, initially; that the baker for carrying out the Cramer method occupied about one-half the floor space for the same capacity as the bakers used in carrying out the prior art methods commonly in use; and that the Cramer method will bake the rods in about one-half the time of the old style baker.

As an example, Acomb gave the following, which appears on pages 24 and 25 of the printed record:

> "An ordinary five gauge rod with heavy lime coating requires at least four hours baking in the old-style baker, and we bake the same rod with the same coating in two hours in the Cramer baker. With this same rod, with a lighter lime coating, that requires from two to three hours to bake in the old-style baker, we bake such rods in an hour or an hour and a half in the Cramer baker.

> "We attribute the saving of time in baking by the Cramer method, over that practiced in the old-style bakers, with their stagnant air, to the rapid circulation of the heated air and a uniform temperature of the baker throughout, due to the circulating air.
>
> "Another advantage is that when the old coal fired bakers were started after a week-end shut down, it required from eight to sixteen hours to get the baker up to operating capacity, while with the Cramer baker with its circulating air, the baker is brought up to operating capacity in an hour or an hour and a half.
>
> "From my own experience, the cost of baking rods by the Cramer method is greatly favorable over the cost of baking by the old-style method. We find that the fuel cost for the Cramer baker is about one-third of the fuel cost of the old coal-fired baker. We eliminate entirely the labor of firing the coal and hauling the ashes, and our repair expense is very much less."
>
> "The quality of the product baked by the Cramer method is much better than the quality baked by the old-style method. The rods throughout the baker are heated uniformly by the Cramer method, and we do not have any difficulty with some rods in some parts of the oven or baker being brittle. Furthermore, we have no foreign substances on the rods from leaky flues, such as smoke or soot, depositing on the rods. With the old-style bakers it was common to have smut and other foreign matter deposited on the rods, especially when the baker needed repairing and the flues leaked, and this smut or smoke was detrimental to the wire drawing."

The record referred to heretofore states that the cost of baking rods by the Cramer method is cheaper than the cost of baking by the prior art methods generally in use. An example of this cost is to be noted from actual records of Cramer's licensee, American Steel & Wire Company, at their Allentown, Waukegan and Consolidated Works as follows:

Allentown Works —	Prior art method of baking Cost per ton	$.220
	Cost per ton of product Cramer method	.049
Waukegan Works —	Prior art method of baking Cost per ton	.277
	Cost per ton of product Cramer method	.115
Consolidated Works—	Prior art method of baking Cost per ton	.099
	Cost per ton of product Cramer method	.054

Considerable variation in the costs of baking in the above will be noted and this is due to the cost of fuel in different localities. It will be noted that at the Consolidated Works, where the most modern type of bakers are used to carry out the most advanced method of baking known prior to the Cramer invention, as compared with the Cramer method, the Cramer method is just a little more than half the cost of the best known prior art method of baking.

It is submitted that Cramer has clearly proven by uncontradicted testimony that the prior art patents and publications relied upon by defendant for refusing Cramer a patent, as solicited by his application, fails to anticipate the Cramer method. It is further submitted that Cramer has proven by the uncontradicted testimony in his record that his method is new, novel and useful. The uncontradicted testimony is testimony of experts which was so straightforward and convincing that not one word of cross-examination was even attempted.

Section 4886 of the Revised Statutes reads:

> "Any person who has invented or discovered any new and useful art, machine, manufacture or composition of matter or any new and useful improvements thereof, not known or used by others in this country before his invention or discovery thereof, and not patented or described in any printed publication in this or any foreign country before his invention or discovery thereof, or more than two years prior to his application, unless the same is proved to have been abandoned, may, upon payment of the fees required by law, and other due proceedings had, obtain a patent therefor."

The uncontested record of this case proves without question that Cramer has invented or discovered a new and useful improvement in the art or method of baking rods and wire which was not known or used by others in this country, etc., as required by the quoted section of the Statute; therefore, a patent should issue to Cramer for his invention and discovery, and he is entitled to the relief he has prayed for.

From an examination of the Findings of Fact, which are the findings of defendant-appellee herein, Cramer's contentions are supported and the only questions which are before this Court are the Conclusions of Law which are as follows:

> "1. It was not invention to circulate the air in the heated chamber of the prior practices of baking rods to remove occluded hydrogen.
>
> 2. Claims 1 to 5, inclusive, of the Cramer application, Serial No. 445,411, are not patentable.
>
> 3. The Bill should be dismissed."

The question of whether Cramer's improved method amounts to invention is one which can be proved only by facts, and it is submitted that the facts in this record showing novelty, usefulness and the lack of disclosure in the prior art clearly supports Cramer's contention that his improvement amounts to invention.

While an improvement, once it is made, may seem obvious, the fact that no one has used it, or at least developed it in the art prior to the time it is disclosed by an inventor, is an argument in the inventor's favor.

In *Ex Parte* Tracy, 13 U. S. Pat. Q., page 91,* the Court of Customs and Patent Appeals stated:

> "It is true the improvement seems obvious. The fact, however, that no one has used it, or at least developed it, in this art prior to the appellant's use of it, is an argument in appellant's favor. It seems to be inventive, and is a new combination of elements which, to our mind, produces a new and useful result."

As is proved by the record in this case, the art had been stagnant for years and a method of baking rods which was not half as efficient as Cramer's method had

* 57 Fed. (2nd.) 383
19 C.C.P.A. 1135.

been in use. The fact that no one had solved the question of improving this old and inferior method, either by their initiative or from the teachings of the prior art, is evidence of the fact that what Cramer did amounted to invention.

In Gillette Safety Razor Company v. Standard Safety Razor Corporation, 23 U. S. Pat. Q., page 269, *A. the District Court for the District of Connecticut stated:

> "The patentee solved his problem by invention and not simply by an act as a skilled mechanic, and this is apparent as the art had been faced by the problem of damaged cap corners, bad shaving and blade breakage for many years, and yet no one had solved it by following the teachings of the prior art." Citing Inland Manufacturing Company v. American Wood Rim Company (C C A), 14 Fed. (2d) 657, 659.

It is easy for tribunals of the Patent Office to state an improvement does not amount to invention after the improvement has been described to them in an application for patent. However, such practice is to be condemned and, as was stated by this Court in Hans Wach v. Conway P. Coe, Commissioner of Patents, Appeal No. 6252, decided March 25, 1935: *B

> "Knowledge after the event is always easy and problems once solved present no difficulties, indeed may be represented as never having had any, and expert witness may be brought forward to show that the new thing which seemed to have eluded the search of the world was always ready at hand and easy to be seen by a merely skillful attention. But the law has other tests of the invention than subtle conjectures of what might

*A - 8 Fed. Supp. 251

*B - 64 App. D.C. 235

> have been seen and yet was not. It regards a change as evidence of novelty, the acceptance and utility of change as a further evidence, even as demonstration." Citing in Lucke v. Coe, 63 App. D. C. 61, 69 F. (2d) 379, in which it was stated:
>
> "All the patents relied upon by the Patent Office as anticipating Lucke's device were before these engineers, yet highly skilled in the art, as they were, they were unable to do what Lucke has done; namely, produce a machine that is a greater advance over the prior art than any one of the patents referred to by the Patent Office tribunals. It is comparatively easy now that the Lucke device is in evidence, to take this and that from the references and achieve as a *nunc pro tunc* solution of the problems confronting Lucke when he made his invention."

Cramer's invention has been proven by uncontradicted testimony to be novel, to have been accepted by the art and to have utility; and he has produced an improved method which is not only a greater advance over the prior art than any one of the patents referred to by the Patent Office tribunals but a novel method which is not even suggested or hinted at by the prior art patents relied upon by the Patent Office tribunals. The Cramer invention is a distinct and novel advance in the art, and it should receive patent protection.

The appellee-defendant argued in the lower court that there was no evidence offered why the hot air removes the occluded hydrogen and the same question may be argued again before this court. Therefore, the court's attention is called to the fact that the patent law does not require an inventor to know the exact theory on which his invention is based. All that the law requires is that he makes such a clear and concise disclosure of his invention that others skilled in the art may practice it. Further in the arguments in the lower court defendant admitted that Cramer had a better way of heating rods. It is submitted here that it is this better way of heating or baking rods that is the novelty on which Cramer's invention rests.

Defendant, in the lower court, argued that if a radiator were used in a room of insufficient size and a fan was used to blow air into the radiator a better distribution of heated air in the room results. This argument is not based on one iota of evidence and there is nothing in the present record to support this argument, and even though it were true, there is no disclosure or teaching in the statement of defendant's counsel which would suggest a method of baking rods at the specific temperatures claimed by Cramer and the specific manner claimed by Cramer. This is evidence of the extremes to which defendant was forced in an attempt to sustain his position and is further evidence of admitted failure of the prior art patents and publications to anticipate the Cramer invention. The Cramer method is limited to removing brittleness from rods and wire caused by occluded hydrogen which consists in enclosing the rods or wire in a chamber, and causing a forced circulation of air heated above 200 degrees Fahrenheit and maintained at substantially constant temperature throughout the chamber. The blowing of air from an electric fan into a radiator in a room would in no wise teach the wire art that occluded hydrogen could be removed, as applicant has taught, in half the time and at half the cost of prior art methods, from the entire charge of a rod baker as against the uneven and imperfect baking and occluded hydrogen removal of the prior art methods.

The Cramer invention is a method and all of the claims of his application are directed to his novel method, and the United States Supreme Court in Carnegie Steel Company v. Cambria Iron Company, 185 U. S. page 483, stated:

> "A process patent such as that of Jones is not anticipated by mechanism which might, with slight alterations, have been adapted to carry out that process. In other words, a process patent can only be anticipated by a similar process.
>
> "A mechanical patent is anticipated by a prior device of like construction and capable of performing the same function; but it is otherwise with a process patent. The mere possession of an instrument or piece of mechanism contains no suggestion whatsoever of all the possible processes to which it may be adapted.
>
> "If the mere fact that a prior device might be made effective for the carrying out of a particular process were sufficient to anticipate such process, the absurd result would follow that if the process consisted merely of a manipulation, it would be anticipated by the mere possession of a pair of hands."

In the present record we do not have a single reference disclosing a method of baking rods and wire to remove occluded hydrogen in which heated air is circulated in a closed chamber; so we do not have what the Supreme Court has said is necessary to anticipate process or method claims.

Conclusion.

No one or any combination of the references contain a disclosure of the Cramer invention as is admitted in the Findings of Fact. Defendant-appellee contends that there will be no invention in substituting Cramer's method for the methods of the prior art. This contention is completely refuted by the uncontradicted evidence of the record, which shows that those skilled in the art could not find in the prior art relied upon by defendant-appellee any teaching of Cramer's invention.

The appellant, Cramer, has made an advance in the art to which his invention belongs as is clearly proven by the record, which advance is totally unobvious from the teachings of the prior art, and he is entitled to a patent therefor.

In view thereof, it is respectfully submitted that the decree of the District Court should be reversed and appellant be given the relief prayed for in his bill of complaint.

Respectfully submitted,

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SUB MR. JUSTICE STEPHENS

UNITED STATES
COURT OF APPEALS FOR THE
DISTRICT OF COLUMBIA
FILED DEC 5 - 1936
CLERK

No. 6822

In the United States Court of Appeals for the District of Columbia

October Term, 1936

Robert E. Cramer, appellant
v.
Conway P. Coe, Commissioner of Patents,
appellee

Appeal from the Supreme Court of the District of Columbia (now District Court of the United States for the District of Columbia)

BRIEF FOR THE COMMISSIONER OF PATENTS

R. F. WHITEHEAD,
Solicitor, United States Patent Office.

In the United States Court of Appeals for the District of Columbia

October Term, 1936

Robert E. Cramer, appellant

v.

Conway P. Coe, Commissioner of Patents,
appellee

APPEAL FROM THE SUPREME COURT OF THE DISTRICT OF COLUMBIA (NOW DISTRICT COURT OF THE UNITED STATES FOR THE DISTRICT OF COLUMBIA)

BRIEF FOR THE COMMISSIONER OF PATENTS

This is an appeal from a decree of the lower court (R. p. 12) dismissing appellant's bill of complaint.

The suit was filed under the provisions of Section 4915, R. S. (35 U. S. C. 63), and sought to have the court authorize the Commissioner of Patents to issue plaintiff a patent on a method of treating rods and wires, containing claims 1 to 6, inclusive.

These claims, as set out in the Bill of Complaint, appear on pages 3 and 4 of the Record and also on pages 2 and 3 of Appellant's Brief. It is deemed sufficient here to merely quote claims 1 and 5:

> 1. The method of treating rods and wire to remove brittleness caused by occluded

hydrogen which consists in enclosing the rods or wire in a chamber, and circulating air heated to at least 200 degrees Fahrenheit and maintained at substantially constant temperature through the chamber.

5. The method of treating rods and wire that have been previously immersed in an acid bath to remove scale and then immersed in a lime bath to form a lime coating thereon, which consists in enclosing the rods or wire in a chamber, causing a forced circulation of the air in said chamber, passing said air during its circulation over a heater to heat said air to a temperature above 212 degrees Fahrenheit and maintaining said temperature substantially constant so as to bake said rods to remove occluded hydrogen absorbed from the acid bath and also to dry the lime coating resulting from the lime bath.

The invention relates to a method of treating rods and wires to remove brittleness after such rods have been treated by what is usually referred to as "pickling."

The "pickling" operation is a treatment with acid for the purpose of removing scale. It has long been known that when wires or rods are so treated they tend to become brittle and that if they are subsequently heated for a considerable length of time that brittleness is removed. This brittleness is said to be caused by the occlusion of hydrogen liberated in the "pickling" operation, in the surface of the rods.

It was well known long prior to any work done by appellant that rods were made brittle during the "pickling" operation and that that brittleness could be removed by subjecting the rods to heat. This is all set out in the patent to Reynolds, No. 205,764 (R., p. 29), in which it is pointed out that wires do become brittle after treatment in an acid bath and that this brittleness can be removed by "exposing the wire for six or seven hours to air heated to 200° or 300°."

In his application (R. p. 56) appellant stated the operation by which such heating of the wires had been carried out, as follows:

> Heretofore, the baking operation has generally been carried out in a more or less haphazard way in ovens or chambers heated indirectly by the burning of fuel and the passage of the products of combustion through sub-floor and overhead flues, the heat being radiated into the oven from the flue walls. Variations of the flue arrangements have been used, but in every instance the heating is done by radiation and no attempt has been made to circulate the air in the oven or baker.

He repeated that statement in his testimony (R. p. 17, third paragraph).

He also described in his application the means by which he proposed to carry out the heating of the rods to remove brittleness. In order to accomplish this he placed in a chamber a source of heat and a fan arranged to circulate the air over that source of heat and over the rods. The description of the apparatus is as follows:

> The present method consists broadly in providing an oven chamber or compartment to receive several trucks loaded with rods or wire, and having a steam coil or other heating element and a fan arranged to recirculate the air from the oven chamber over the heating element and through the chamber. After the rods or wire are positioned in the oven chamber the fan is started to force the continued recirculation of the oven air over the heating element, thus filling the whole oven chamber with high temperature circulating air, causing a uniform temperature throughout the chamber and thoroughly baking and drying the rods or wire in a minimum of time.

Appellant seems to argue (Brief, pp. 3, 4, and 5) that because the Patent Office has not shown a literal anticipation of the process as claimed and since it is not denied that the process is useful, it necessarily follows that invention was present and the claims are patentable.

On page 3 of the Brief is found the following:

> Another novel part of the present record is that the Findings of Fact admit novelty in Cramer's invention. There is not a single finding of fact against Cramer's contention that his invention is novel, new, and useful.

It is impossible to see where any novelty is found in the present record, as stated. It is a very unusual thing for a case to come before this Court on appeal, directly or indirectly, from the Patent Office in which both novelty and utility are not admitted, but the mere fact that a device or a process is novel and useful does not, of itself, establish patentability. It must appear that there was invention. Furthermore, the conclusion that there was invention cannot be determined from the mere presence of novelty and utility.

In the case of *Thompson* v. *Boisselier,* 114 U. S. 1, the Court, in discussing that question, said:

> In the Act of July 8, 1870, 16 Stat. 201, sec. 24, the patentee was required to be a person who had "invented or discovered any new and useful art, machine, manufacture or composition of matter, or any new and useful improvement thereof"; and that language is reproduced in sec. 4886, Rev. Stat. So, it is not enough that a thing shall be new, in the sense that in the shape or form in which it is produced it shall not have been before known, and that it shall be useful, but it must, under the Constitution and the statute, amount to an invention or discovery.

Nor is it controlling that the later device was an improvement on the devices of the prior art.

In the case of *Pearce* v. *Mulford,* 102 U. S. 112–117, with respect to that question, the Supreme Court of the United States said:

> His chain may have been an improvement on the chains that preceded it. In some par-

> ticulars it doubtless was. It left the elasticity of the spiral gold tubing more free by releasing the link from the attachment of the soldering, and it enabled the chain to be freely taken in pieces without injury to its structure. But all improvement is not invention, and entitled to protection as such. Thus to entitle it, it must be the product of some exercise of the inventive faculties, and it must involve something more than what is obvious to persons skilled in the art to which it relates.

At this point it may be stated that the testimony which was presented to establish that the process involved herein was new in its specific aspects and useful, was merely proving that which was admitted. It therefore becomes necessary to see just what is the novel feature set out in appellant's specification and in his claims.

Admittedly, by appellant's specification and by his own testimony, everything set out in claim 1 is old except "circulating air", and the same is true of the other claims, which specify, for example, "causing a forced circulation of air * * * through the chamber" (claim 2), and "recirculating air in said chamber" (claim 3).

The novel feature of appellant's disclosure, therefore, may be said to reside, not in a process of treating rods and wires to remove brittleness, but in a process for improving the heating of a chamber in which rods or wires are submitted to heat to remove brittleness, by causing the air in said chamber to be circulated.

The patent to Cantoni, No. 1611632 (R. pp. 32–38), shows in its drawing, and describes in its specification, an apparatus for drying fruits and vegetables in which the fruits or vegetables are placed in a closed chamber containing a source of heat and having therein a fan to cause the air to circulate throughout the chamber.

Furthermore, it was submitted to the Court below, and is submitted here, that the court can take judicial notice of the fact that there is nothing new in circulating air over a heating element in order to get a better distribution of heat.

In its decision (R. p. 89) the Board of Appeals said:

> In applicant's process the heated air is circulated so that it comes into contact with all parts of the rods and the hydrogen is uniformly removed from the entire surface portion of the rods. The operation is also speeded up because the air is circulated. We do not believe that this difference is sufficient to render the claims patentable. It is so well known that where a fluid medium is used to transmit heat the operation may be speeded up by circulating the fluid. It is also well known that a more uniform heating of the articles can be obtained by circulating the fluid.

It is so well known that the Court can take judicial notice of the fact that if air is blown against a heated radiator in a room the heated air will be circulated and a better heating of the room obtained than if reliance were placed merely upon the heat radiated from the radiator.

It is submitted that in view of appellant's own admissions as to what was old and in view of the well known facts with relation to the circulation of heated air and the disclosure of the Cantoni patent, there was no invention in circulating the air in a heated chamber designed to be used for the baking of the rods or wires after a "pickling" operation.

Claims 4 and 5 include the statement that the rods and wire had "been immersed in a lime bath to form a lime coating thereon" after the immersion in the acid bath. That is, however, a conventional step, as is shown by the patent to Aiken, No. 288,150, page 1, lines 32–38 (R. p. 30), by the specification of appellant's application (R. p. 55), and by the testimony. (See R. p. 21.) Its inclusion in these claims, therefore, adds nothing of invention.

While there is no fixed rule by which it can be stated that something was or was not invention, it is submitted that under a long line of decisions of all the courts it is not invention to do that which was directly taught by the prior art or which is obvious from the prior art. The question of invention has come before this Court very frequently and the Court has not hesitated to hold that claims were properly denied to an applicant on the ground that they defined no invention over what was old.

In his Brief appellant cites the case of *Gillette Safety Razor Company* v. *Standard Safety Razor Corporation,* 8 F. Supp. 251, in support of his argument that what was done by appellant was invention. That decision, however, is no authority for the proposition stated in it for the reason that the decree of the lower court was reversed on appeal by the Court of Appeals of the Second Circuit (74 F. (2d) 691). In its decision, the latter Court said:

> The simplicity of accomplishing this result or, in other words, solving the problem, required no inventive thought. The type of blade was not new. If anything, all that was new was the cutting of the recesses in the corners, that is, cutting the corners of the flexible blade used for the Gillette-type safety razor. As we said in *Gillette Safety Razor Co.* v. *Standard Safety Razor Co.,* 64 F. (2d) 9, "it was the obvious and inevitable thing to do to cut the blade to fit the bar." So it was here necessary to cut the blade to accommodate the lugs.

The Supreme Court of the United States had before it recently another safety razor patent in *Essex Razor Blade Corporation* v. *Gillette Safety Razor Company,* Case No. 21, and in its decision handed down on November 9, 1936, that Court said:

> As already suggested, every safety razor consisting of a combination of guard, cap,

blade, and clamping means must also provide means to keep the blade in position relative to the cap and guard. The means adopted have been various. Gillette resorted to the device of square rods or round pins fixed either to the guard or to the cap and slots or holes in the blade and the other member through which the rods or pins should pass to fix the blade in position. Gaisman fixed the blade relative to the guard by one set of lugs and slots and fixed it in relation to the cap by another set of lugs and slots. The choice was one between alternative means obvious to any mechanic; it did not have the quality of invention.

It is submitted, therefore, that the claims were properly refused by the Patent Office, that the bill was properly dismissed by the Court below, and the decree of that Court should be affirmed, with costs against the appellant.

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NOVEMBER 1936.

U. S. GOVERNMENT PRINTING OFFICE: 1936